THE GEOGRAPHICAL MAGAZINE

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British Cattle Ranches in America

by HERBERT O. BRAYER

The part played by British capital, livestock and men in the development of America's Western cattle industry is little appreciated even in the United States and has never hitherto been fully surveyed. Professor Brayer, who is Director of the Western Range Cattle Industry Study (sponsored by the State Historical Society of Colorado, the Rockefeller Foundation and the Library of Congress), will be publishing at a later date the results of five years' investigation of this subject. During the past fourteen months he and Mrs Brayer have been in Great Britain consulting the records of British companies and men whose role in the "Wild West" is described in the following article

"POWDER RIVER, let 'er buck!"—ran the freesome trail shout of the ebullient Texas cowboys as they started the thousand-mile "Long Drive" with three thousand lean, bellowing long-horned cattle bound for the high grassy Elysian ranges in northern Wyoming's Powder River country. For half a century now scores of British readers have avidly devoured the romantic "blood and thunder" (and, fortunately for Americans of that era, highly exaggerated) accounts of the stirring history (*c.* 1870–1900) of the great range cattle industry in the Prairie, Plains and Mountain States and Territories of Western America. Familiar to all such devotees of Zane Grey, Eugene Manlove Rhodes, Owen Wister, Luke Short, William Macleod Raines, B. M. Bower, and the scores of other creators of the Westerns, are the cattle and sheep 'wars', the battles for ranges and water, and the other plots around which are woven an unending stream of adventurous "penny dreadfuls" which appear with unfailing regularity on the stalls of Charing Cross and Princes Street as well as on Main Street and Broadway.

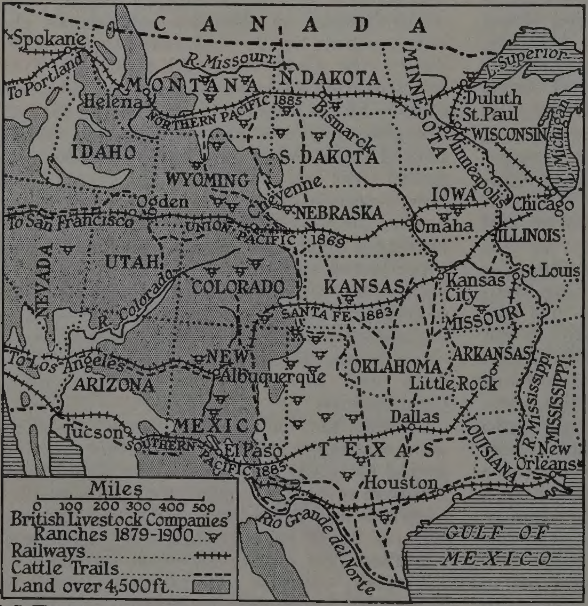
One such recurring pattern entwines the fortunes, or lack of them, of the young "tenderfoot" Englishman. The theme has two familiar forms: the young nobleman (or son of an Earl—no less rank would suffice) who has, through no fault of his own, almost lost his fortunes and estates or suffered disinheritance and hurried to the West to recoup or to build an independent "nest egg", and marry a "poor but virtuous and industrious nestor's (land squatter's) daughter", who doesn't even suspect he is going to inherit the Earldom in the end; or the sad account of the ne'er-do-well wastrel, "black sheep of a titled and honoured family", who was shipped off to America to prevent further embarrassment to his proud relatives, and who amid the great expanse of the American West became celebrated in fiction, and in fact, as a "remittance man". Each type did have an underlying basis of fact in real life, but almost lost amid the maze of romance that now beclouds the era are the no less interesting truths of the actual contribution of British men and capital to the development of America's great western cattle industry.

Following the war between the States (1861–5), a combination of not unrelated circumstances in Europe and America led to the rapid development of the livestock industry west of the Mississippi River. Industrialization in America—outside of the now prostrate South—had made rapid strides during the Civil War and resulted in the concentration of large populations in urban areas. The immigration curve swung sharply upwards again as Europe's depressed masses poured into America's eastern ports and spilled over into adjacent areas to swell the large reservoir of cheap labour needed in the newly developed and rapidly expanding industrial machine. Food was needed in unprecedented quantities and the agricultural areas of the Middle West—home of thousands of transplanted farmers from Europe—utilizing the lusty but as yet uncompleted network of railroads, produced the breadstuffs, produce and meat for the swelling urban communities.

Europe, too, had become part of the American economy (though the farmer of that period had little knowledge of its significance at home or abroad), with thousands of tons of grains as well as preserved meats—in the form of hams, bacons, salt pork, corned and barrelled beef—being exported annually to Liverpool, Glasgow and London as well as Marseilles, Le Havre, Amsterdam and Hamburg. The repeal of the Corn Laws had opened the gates to a flood of cheap American grain with startling effect upon the agricultural community of Great Britain. It was, however, but the opening wedge which within a half-century was to bring this nation to a dependence upon the agricultural countries of the world which Cobden and his adherents had confidently thought impossible. They reckoned without the ingenuity of man, without the miracles of rapid land and sea transportation, and the preserving effect of refrigeration.

During the 'sixties and early 'seventies British agriculture, already in the throes of reorganization resulting from the American grain traffic, suffered a second disaster—cattle plague. For decades English and Scottish livestock raisers had become increasingly dependent for store cattle upon cheap Irish and continental imports. After the repeal of the Corn Laws this business had developed rapidly as English and Scottish farmers curtailed their corn crops and sought by augmenting their feeding operations to realize the profits that they had lost from once valued grain harvests. Hundreds of thousands (from 500,000 to 750,000 after 1870) of coarse foreign beasts were driven annually from the ports to be fattened for Britain's meat-hungry industrial populations. Then, with unprecedented virulence, disease struck the herds, spreading through the cattle-raising counties with the speed of a prairie fire. Despite stringent quarantine acts and the best of veterinary skill the plague decimated the herds in many parts of England. In the face of the resulting scarcity, the price of beef soared and protests against meat prices filled the press and became the subject of questions in the Houses of Parliament.

It was at this critical moment that conditions and events in America destined to play a vital role in the catastrophic meat situation in Britain began to take recognizable form. Despite her own expanding home market America had a surplus of beef cattle. In addition to millions of horned cattle raised on the farms of the eastern, southern and middle western States, there were the rapidly expanding herds of the great West. Texas alone claimed more than five million head of range cattle in 1870, and thousands of these were annually spilling over her borders into the Prairie, Plains and Mountain States. The spectacular pre-war "long drives" to St Louis and Chicago from the ranches of Texas were but forerunners of the arduous drives to the Indian Territory, Kansas, Nebraska, Colorado, New Mexico, Wyoming, Montana and Dakota during the 'seventies and 'eighties. Unfenced and unsettled (except for wandering Indian tribes and large herds of native bison), this huge pasture—more than seven times the area of the United Kingdom—offered many inducements to the stock raiser. As part of the Public Domain the land belonged to the Federal Government—open land where the rancher could homestead a quarter-section (160 acres) for 6s. an acre in a well-watered valley, or along one of the streams, and range his cattle over thousands of acres of adjacent Government land without further cost. Nutritious grasses—wild hay, gramas and buffalo—grew abundantly and cured naturally in the sun, providing free wholesome feed throughout even the winter months. In many areas the mild winters made shelter unnecessary and the rugged Texas Long Horn actually seemed to add weight despite the season and the lack of the traditional protection provided in other parts of America as well as in Europe. During the 'seventies hundreds of ranchers—men frequently with



A. J. Thornton

little capital but with ability and energy—settled in the grass country, purchased a small herd of cattle and then waited for the annual calf crops, varying from 35 to 75 per cent, to multiply their herds; free land and nature combining to produce the "Cattle Barons of the West".

Cattle were marketed in the spring and autumn, and a lean, lanky Texas steer purchased for £2 : 10s. after being driven up the trail, frequently brought £7 : 10s. or £8 a year later, while the cost of his care and feeding had averaged but 5s. a year. During the 'seventies the "Cattle Barons" or "Cattle Kings" of America flourished, and the "fabulous profits" (highly exaggerated) reported widely in the press served to draw scores of would-be ranchers from every walk of life and from many countries. The completion, in 1869, of the Union Pacific Railroad, first of the great transcontinental transportation lines, together with the almost simultaneous projection of a dozen other trans-Mississippi roads, brought the range 'factories' closer to the metropolitan markets at Chicago, St Louis and Kansas City. By the summer of 1873 the Western Range cattle industry had reached major proportions, but in spite of this development and the appreciable profits realized, the acute world-wide depression prevented the full recognition of its potentialities until 1877.

Two events in this period, however, had a direct effect upon the future of the ranching and meat business both in relation to America and more especially to the United Kingdom: the invention and successful trials in 1873 of the refrigerated railway wagon, and the subsequent adaptation of the technique to trans-Atlantic traffic. Experimental commercial shipments of refrigerated beef were sent from New York to London and Liverpool in 1876, and in the following two years similar ventures were undertaken from Philadelphia, Baltimore and Boston. Thus it was that at the same moment that Britain found herself confronted with a series of disastrous plagues amongst her herds, with soaring beef prices and a shortage of supply from her usual sources—due in part to the widespread effects of the plague on the Continent as well as in Ireland—America had at hand both the cattle and the technical knowledge necessary to alleviate the initial effects of the onslaught. The solution was not wholly an unmixed blessing for, despite its favourable reception by the ultimate consumer, the effect of the resulting influx of American livestock and dead meat was to depress local markets and force high-cost British-grown beef to compete with the cheap production from America's abundant ranges and well-supplied feed lots.

Descendant of stock introduced by the Spaniards, the Texas Long Horn could thrive on sparse forage and withstand the thousand-mile "long drives" to market in the pre-railroad era

Britain, however, needed beef and the budding trade in livestock and dead meat during the late 'seventies broke into full flower in the early years of the 'eighties. By 1885, and despite a quarantine that forced their slaughter at the ports of debarkation, over 100,000 head of American live cattle were being carried annually to the foreign cattle markets at Deptford, Liverpool and on the Clyde. An even larger number of cattle were being slaughtered, quartered and packed into newly-equipped refrigerator ships bound for Britain. Hundreds of thousands of pounds of tinned, barrelled and corned beef, and tons of bacons, hams and "variety meats" from the packing plants at Chicago were annually reported in the agricultural import returns.

Scottish and English importers, shipowners, financiers and promoters were quick

rtesy of Western Range Cattle Industry Study

Two paintings by Charles Russell, pioneer cowboy artist of the last decades of the 19th century, who himelf worked as a ranchman and portrayed vivid scenes of the now vanished life of the unfenced, open ranges. Above) *Heavy freighting wagons being hauled with supplies to the remote market centres of the ranchmen.* Below) *The cattle business was a hard one: eighteen hours in the saddle a day and plenty of hazards*

rtesy of Western Range Cattle Industry Study

to recognize the significance of the American traffic. A score of new British-American livestock and fresh-meat importing companies were incorporated in London, Liverpool, Edinburgh, Dundee, Aberdeen and Glasgow. British ships were rapidly equipped with either the patented American refrigerators or the newly developed designs produced at home. Wealthy landowners (many titled), a considerable number of successful Midlands industrialists, and London financial leaders undertook big-game hunting expeditions to the Rockies, only to return with enthusiastic descriptions of the country and carefully drawn options on some of the leading American ranches.

By 1877 the ranges were dotted with dozens of small herds, and the choicest grazing areas were rapidly filling up, but a basic change was already evident. A movement for the amalgamation of a number of small independent 'spreads' into large corporately-owned ranches with thousands of cattle roaming over wide areas controlled by the companies was already under way. The corporate entity was beginning to challenge the primacy of the individual "cattle baron" and the new type of organization was able to secure sufficient capital through issues of securities to take full advantage of large-scale operations. The British capitalist (aided in part by the unrivalled sales ability of his hospitable American hosts) recognized the opportunity of providing the capital for stocking the great ranches and dreamed of the 50, 60 and even 75 per cent annual profits reputed to have been earned by some of the more successful "cattle kings". Already heavily committed in American rails, gold and silver mines, and land development companies, the time had come for the British capitalist to enter actively the livestock business, and to bring with him the hundreds of small investors who also sought a share in the golden harvest from the Far West.

By the summer of 1877 the West was well known to a goodly number of English travellers, writers and hunters, and to a number of financial leaders in the City, Edinburgh, Dundee and Liverpool. The Earls of Dunraven and Rosslyn, S. Nugent Townshend ("St Kames" of the *Field*), the Duke of Airlie, John G. Adair of Kildare, James F. Barclay, M.P., of Forfarshire (now Angus), James Duff of Dundee, John Clay of Kelso, Moreton Frewen of Brede in Sussex, and William Blackmore of Salisbury and London were but a few of the British visitors who, after stalking the bear, deer, elk and buffalo, or casting for rainbow trout in the rushing streams of the Rockies, recognized the opportunities of the West and became active participants in one or more of the numerous large ranches founded in the western States and Territories. Hotel registers in scores of frontier towns bearing such curious names as Deadwood, Cheyenne, Fort Union, Helena, Kit Carson, Santa Fé, Silver City, Pie Town and Las Vegas contain the record of thousands of Scotsmen, Englishmen and Irishmen who paid the "cow country" a visit.

A considerable number like John Adair and Lord Rosslyn purchased large ranch interests and associated with established cattlemen—Adair employed the pioneer Texas "cattle king" Charles Goodnight—in their ventures into the range cattle business. Others, desiring to share the risk, formed joint-stock companies and issued securities which they sold to scores of investors throughout the British Isles. Between 1879 and 1889 thirty-six such companies were incorporated in England and Scotland with a total capital exceeding eight million pounds. About a dozen companies claimed during the mid-'eighties to own herds of more than 100,000 head of cattle each. The size of the ranges was equally phenomenal, with no less than a score of companies claiming ownership or exclusive use of more than a million acres of grass land—usually unfenced.

While British money was pouring into the ranches where the basic stock was being raised for the eastern and British livestock and meat markets, additional funds were invested in the newly organized stock-yards, feeding and fattening farms, slaughter and packing companies, and latterly into the forwarding houses engaged in shipping live cattle or dead meat to the markets of Great Britain. A fleet of British-owned and operated ships constructed for the transport of livestock plied the Atlantic between New York, Boston, Philadelphia and Canadian ports carrying the cattle of America to the butchers of England and Scotland. The descendants of the blooded Shorthorn, Durham, Hereford and Angus stock which had sprung from the soil of Britain returned in ever-increasing numbers during the last two decades of the century—many coming from British ranches in the American West.

The business was fraught with numerous vicissitudes. Drought and unprecedentedly harsh winters decimated the herds at various times and in large areas; depressions and financial crises together with monopolistic practices by buyers and packing-house combines depressed prices; range wars, the coming of ever-increasing numbers of homesteaders who settled on the public domain, government restrictions, and lastly the changing nature of the cattle business itself, made the business a precarious one despite the high returns obtained on a few occasions. Over a period of thirty years the average annual return of those companies which survived was but 7 per cent. Millions of pounds were irretrievably lost through unwise investment, over-expansion or faulty administration.

Around pungent mesquite or scrub-cedar camp fires during the spring and autumn 'roundups', and in many a snow-bound bunkhouse during the winter, cowboys still repeat the stories of the "old West". Some old-timers still remember the days when the boss entertained English lords and ladies, or Scottish secretaries or directors. Occasionally the boys still chuckle over the story of that energetic Scot, Finlay Dun, Secretary of the Swan Land and Cattle Company Ltd.—once the largest cattle company in America. Buying a herd of several thousand head of cattle was a tricky business. Dun, after some years of controversy with the American vendors, decided actually to count, head by head, the vast Swan herd estimated at more than 100,000 cattle. The wily Scot refused to accept the usual method of tallying and, to the amazement and exasperation of the range-wise cowpunchers, stationed a man at a specially-prepared counting-chute with instructions to place a smear of red paint on the side of each animal as it was driven through the narrow opening. Rounding up some 100,000 cattle was job enough, but, after counting some 40,000, Dun discovered that the first animals tallied were indistinguishable from those remaining to be counted—they had rubbed or worn the paint off in the course of a few weeks. Thus the Scot was in danger of counting some of his herd two or three times! He gave up in disgust and went home.

In fact the West still smiles at tales—some quite authentic—of how the same herd was sold twice (or even thrice) to the same British buyer. Counting a vast herd was practically an impossibility and the purchaser was forced to accept the records of the vendors. A few of the latter were unquestionably dishonest and 'padded' their calf-branding records and tally books, but the practice was in no wise as widespread as was believed in the 'eighties. Some British purchasers, like Dun, insisted on actually counting the herds despite the attendant difficulties. One of the "top yarns" still spun around the camp fires involves Moreton Frewen, Sussex sportsman, ardent exponent of the cattle trade between America and Great Britain, and founder of the famed Powder River Cattle Co. Ltd. in Wyoming.

Frewen, according to the story, was the victim of a ruse whereby he purchased the same herd of cattle twice. The counting-chute, according to the story, was near the base of a hill. As the cattle were driven slowly past the tally-men the vendor's cowboys merely drove the animals around the hill and back again past the perspiring counters. Frewen vigorously denied the story in his later years, but the Scottish chairman of his board of directors insisted on its validity. It is only fair to note, however, that the same tale is told from Texas to Montana and in each instance concerns a different "English tenderfoot".

A romantic story widely circulated in 1880, and which has not lacked for embellishment in the intervening half-century, concerns the Earl of Dunmore and a very enterprising daughter of Ireland, Miss Middy Morgan. The lady, finding her family in the Emerald Isle in a somewhat destitute position, emigrated to America and under an assumed name went to work on a western farm. " So completely did she identify herself with the change in her position, that in a short time she had acquired so much skill in the breeding and rearing of stock that the farmer, perceiving her value, admitted her to a partnership in the farm." Her fame spread abroad and at "every great fair or market she was seen, with broad-brimmed hat tied down beneath her chin by a bandanna handkerchief, a thick frieze coat with many capes, short skirt, ingeniously gathered into high leather boots, something like knickerbocker costume ". It was while in Montana, where he was negotiating for the purchase of a large cattle ranch, that the Earl of Dunmore met 'fair' Middy. She, according to the story, was immediately appointed as his adviser.

Humour, romance, success and failure—all were part of the broad picture of British ranching in Western America. The successes were few but marked, the failures were numerous but none the less important. The press of England and Scotland during the last decades of the 19th century carried weekly accounts of the trade and its development, while the less economically-minded reader found long and sometimes fanciful articles describing the life and work of his fellow citizens in the "cow country" of the West. Some descriptions were excellent, others were filled with exaggeration and even outright fabrication. But to leaven the whole was the occasional colourful story which became so well known as to find a permanent place in the folklore of the period. A short paragraph

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Pure-bred Hereford cattle in the Rockies of Colorado at about 9000 feet above sea level. The Hereford has been used more than any other British breed to raise the quality of Western range stock

in the *Pall Mall Gazette* on March 15, 1884, falls into the latter category and has been repeated in many forms:

> . . . Apropos of this ranch business some interesting particulars have been recently received in this country concerning the method in which the Earl of Aylesford lives on his ranch of 37,000 acres in Texas. The only stock that he has on the farm at the present moment is 20 or 30 horses, 13 dogs, and five servants. He has not enough money at present to buy cattle. According to an American account, the Earl is a hale fellow well met with all the cowboys of the neighbourhood; but his popularity is only natural, seeing that he is said to stand treat for the whole population whenever he comes to town. On the ranches he is known as "the Jedge". "The Jedge always cracks a fresh bottle when a cowboy strikes his camp," said a sociable member of that persuasion, "and he don't stop on one, neither. I've been to the ranch many a time," he continued, "to stay all night an' woke in the mornin' to find the bottles lying around as thick as fleas on a goat, the boys two deep on the floor snorin' like a mad buffalo, an' the Jedge with a bottle in each hand over in the corner."

Despite the over-accentuated colour and frivolity the importance of the British contribution to the range cattle industry of the West cannot be denied. It was British money—at a period when a financially exhausted America, recovering from four years of disastrous civil war, had plenty of enterprising men but little capital for investment—that made possible the spectacular expansion of the industry; it was pure-bred British cattle and their progeny—Angus, Shorthorns, Herefords and Durhams—that converted the lean and lanky Texas Long Horn of the pre-railroad era into the short, heavy beef stock of the 20th century; and lastly British 'know-how', derived from generations of beef production in England, Scotland and Ireland, played a vital role in 'taming' the "Wild West".

Colour in the Highlands

by Dr F. FRASER DARLING

The colour-plates accompanying the following article are reproduced by permission of Adprint Ltd. and the Editors of the New Naturalist *Series, published by Collins, in which they will shortly appear as illustrations to a volume by Dr Darling entitled* Natural History in the Highlands and Islands

When I came to write this essay I could not help wondering why Colour in Landscape would not be just as good a title, why Colour in the Highlands should merit special description. So much is drab so often. What have these sheep-ridden hillsides and overburnt bogs to offer in comparison with the English scene of barley fields with a scattering of poppies, headlands and roadsides blue with cornflowers and cranesbill, orchards in blossom, and noble trees? The same sun shines over our few degrees of latitude.

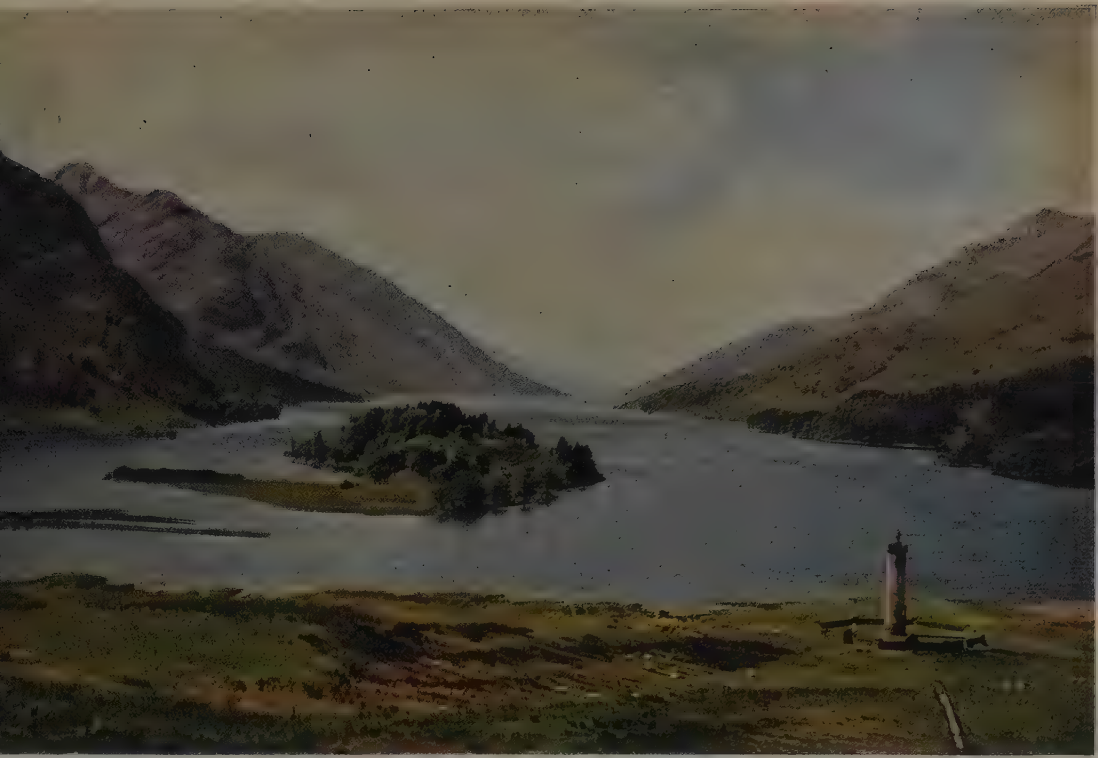
Perhaps the fundamental difference in an appreciation of colour in England or in the Highlands is that of distance, and secondly that of atmospheric conditions over different soils. Much of the charm of colour in the English landscape is in things near, such as a garden, a farmstead under the Downs or a riverside. Colour in the Highlands has to do with the large view in which sunshine and shower can play, with the immensity of ocean and sky, and with the textures of very large surfaces in several planes.

Weather is of particular significance in colouring Highland landscape. Generally speaking, the atmosphere is humid, but sometimes the evaporation rate is high, with the result that the air acts as a magnifying glass and is of wonderful clarity. Colour is then both deep and delicate, and if there is some discrete cumulus cloud in the sky with enough breeze to keep the cloud moving, change in colour is rapid and watching it becomes a long-protracted and delightful occupation.

Let us take a Highland glen with hills in the background, of which the picture opposite gives an impression in high summer in good weather after a period of rain. The conditions at such a moment are more or less as described in the preceding paragraph. The depths of colour in the hills vary with distance and sunshine or shadow: only the nearest hillsides become real, as it were, clothed with the greenness we know to be herbage. The same kind of clear, sunny weather with an atmosphere heavily charged with moisture will, even in winter-time, produce the same recession of tone in the hills, though the colour of their herbage seen close at hand has then changed to buff. In short, atmospheric conditions dictate colour.

The geological formation certainly affects particular moments of colouring in Highland landscape, though climatic conditions may be strong enough to mask this factor at other times. I remember how the purple-red Torridonian sandstone once produced its special beauty on a December day when there was a sharply defined ceiling of dense mist at 1000 feet, which completely hid the tops. The still atmosphere below was saturated but clear. Looking eastwards from my position on the red, glacier-scarred surfaces of the rock, I saw the hundreds of acres of birch woods at the head of the glen. These trees appeared then as a blanket of deep purple, toning with the colour of the rock and with the dark, sodden herbage. The whole beautiful effect was heightened by some groups of Scots pines which stood between me and the unbroken purple of the birches. Their bottle-green crowns were bright in this landscape which, as it were, had no sky at all, and being nearer than the birches, the nature of the foliage of the pines made a welcome broken texture of its own dark green. The upper branches of the conifers, and even the darker trunks, picked up with the purple and red of birches and rock. Such a scene could not be recorded very well as yet by colour photography because the light values would not be good enough.

Birch trees are extremely susceptible to change of season and weather conditions in the visions of colour they may give to us. The picture on page 137 seems to me a particularly true representation of birches in an open position on the eastern side of the Highlands in early autumn. The leaves have reached the ochreous stage and are brilliant; the bark being unencumbered by lichens is truly silvery in this drier climate of the east, and in this situation the colour of the leaves is picked up again in the herbage which is tending to gold in the autumn before exposure and the withdrawal of sap have withered it to a colder buff. There is no hint in this picture of the deep purple of the birches in the scene described earlier, nor is there any promise of another winter colour of birch trees—that of burnt sienna coming faintly



J. Jenson

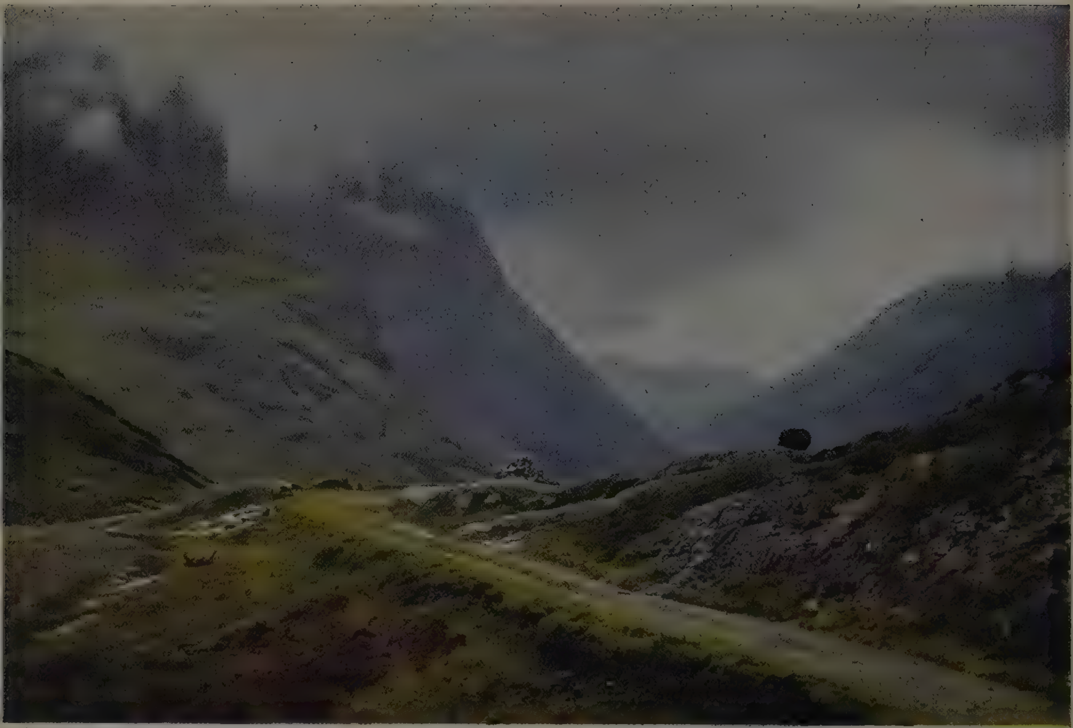
Loch Shiel from Glenfinnan, Inverness-shire, with the monument to the men of 1745 in the foreground. This view, notable for its symmetry, shows the apparent change in colour of the hills as they recede from the eye, growing paler in the far distance. The planting done here by the Forestry Commission, a large local landowner, will change the colour values of this landscape considerably

from the trunk and brightly from the dark twigs to suffuse the air among the trees as the observer sees the sun shine through them on a frosty January morning. Some of the Swedish painters have caught such moments when the birch most expresses its northern character.

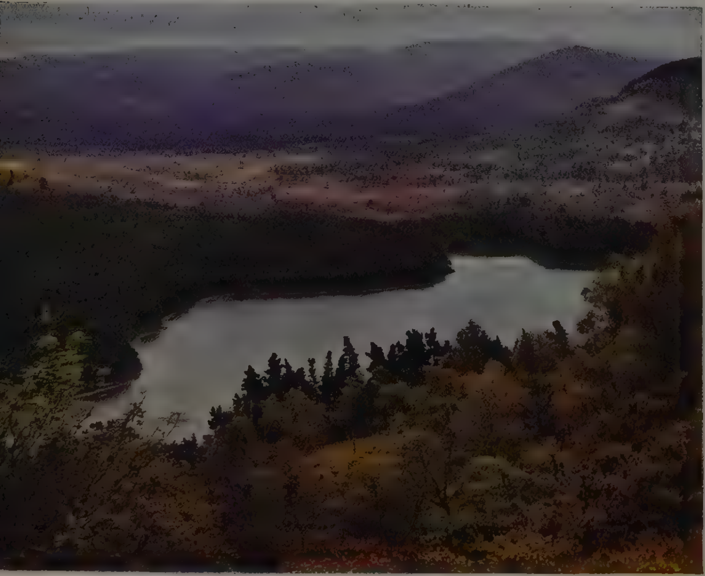
The summertime green of birch foliage may become monotonous when the tree clothes a whole hillside and it varies little from that of the herbage, but there is one joyous moment in May when the young leaves emerge and catch the sun. The green is a tender one, the surface of each leaf has its texture of being not quite unfolded and thus refracts the light, and each tree shines in a way quite lost after the leaf flattens and darkens.

Where woods occur in the Highlands and are visible from afar, their character can be accurately judged by their colour. Gaeldom describes the pine forest as *coille dorcha* or *coille dubh*—the dark wood or the black wood. The name is a good one, for when seen from a distance against the lighter hillside, the shining bottle-green is no longer evident, nor the red of the upper branches. That descriptive term used for an old black coat "green with age" just fits the colour of the pine wood. Leafless birch is purple, but along the north sides of some Highland glens and sea lochs there is a lower band of oak wood. This appears grey-green in winter because of the accumulation of lichens extending from the trunk to the outermost twigs. Birches and oaks overlap each other and provide the observer with some very fine patterning in a zone of accentuated colour. When in leaf the patterning may still be seen, two leaf greens replacing the purple and grey-green of winter.

If one is to extract the full pleasure and sense of completion from contemplation of colour in Highland landscape, it should be seen for a whole year so that the different arrangements of colour on the one design may be appreciated and understood. Speak-



B. A. Crouch



ohn Markham

(Above) "*Weather is of particular significance in colouring Highland landscape. Generally speaking, the atmosphere is humid . . .*" *In Glencoe the heavy, precipitous rock masses create shadows in the heights so that the effect of the scene is awe-inspiring even in good weather*

(Left) *Loch an Eilean in Rothiemurchus Forest. The pines show well the Gaelic description of "the dark wood". The rowans and birches in the foreground give much lighter effects. The colour range of the hills in such weather is between indigo and powder blue*

(Right) *An old birch wood in which there is no regeneration because of the continual grazing of too high a sheep stock. The trunks are covered with lichen and therefore do not appear silvery. The green of the foliage is like the summer green of the hillside herbage*

(Below) *Thin pine cover in Abernethy Forest, Strathspey, showing the broken quality of the dark-green foliage. When the sun shines, pine trees have a contrasting vivid brilliance, resulting from the hard surface of individual needles and the bunched manner of their growth*

James Fisher

John Markham

John Markham

Ben Macdhui, 4296 feet, in the Cairngorms. Although the colour of all the land is that of the nearer rocks and herbage, distance makes the hills blue. Sun shining through well-broken cloud dapples the landscape and, with light wind, produces for the observer a pageant of stately movement

ing for myself, I do not think I should enjoy colour in landscape nearly so much did I not understand the natural history which was going to its building. The landscape for me is not a picture but the marvellous three-dimensional reality, known in its composition of the different kinds of woodand, moors of heather or flying bent, the lighter green alpine pastures and the sombreness—except in autumn when it is a brilliant gold—of the wastes of *Scirpus* sedge. Such understanding of the plants clothing the ground and seeing them through the seasons will discover to the receptive mind the existence of single trees to which his wandering feet had not taken him. I know of ash trees that have thus appeared in spring and autumn which were not conspicuous a mile away in summer or winter. The English proclaim the beauty of their spring, and rightly; but in Scotland, equally rightly, the season of autumn is that most admired for colour. Highland weather often spoils Highland autumns by blasting the leaves from the trees with a succession of equinoctial sou'-westerlies or cutting them off in October with fell south-easterly winds. But if we get a calm and almost rainless October as in 1946, St Martin's summer must approach near to the beauties of New England in the fall.

Heather is a plant which covers whole hill-sides in the eastern Highlands, but is not characteristic of western hills where conditions are usually too wet. Its dark-green foliage is not unlike that of the pines, except for a touch of sage or olive which one may catch in it. Where it grows well, heather darkens a hillside for eleven months of the year and greatly enriches the texture of landscape, and for the twelfth month in late summer its purple flowering is as unbelievable as it was the year before. Opinions may differ as to whether the landscape is better for this predominance of purple. Heather does not withstand heavy frost, and if this should occur without snow, large areas of hill may appear a rusty red. Perhaps the association of this with disaster causes the knowledgeable observer to be unable to see beauty in such a scene, for it is one of death.

Snow is a gentle mantle protecting the high ground. The coming of heavy snow is followed by calm, clear weather, and if the frost so hardens the crust as to allow you to climb high, you will lose the white world as the sun wanes and see one which is almost sea green like the wave on an Atlantic beach. And were you there at sunrise the world would be rose, everywhere.

The land is but half the Highland scene. Ocean and small island and shore line provide as much colour as the landward areas, and the sky is much richer of colour and pattern than that portion of it visible among the hills. There are many days, of course, when the seaward view is empty of colour to our eyes and becomes tiresome. South-easterly winds are most effective in producing this unpleasantness. The sky is uniformly dirty grey, or there may be long torpedo-shaped darker clouds which seem further to add to the depression. The air is far from clear and seems pervaded with greyness. All distant coasts are indeterminate grey and so is the sea. Indeed, the only relief from grey is the white of breaking waves against island cliffs. The very grass loses greenness.

Yet this depressing south-easterly weather produces what are probably the most violent colours visible at any one time—all in the sky, and at sunrise only. They are almost frightening and do certainly strike awe into a suffering naturalist encamped on a small, exposed island. The worst sky of this kind I ever saw was in October 1937, on the Treshnish Isles, west of Mull. Pea green, emerald and jade; orange, ochre and saffron; red and cerise (oh, how horrible is cerise!), and what seemed cruellest of all, I don't know why, a brilliant cobalt blue such as I had never seen before. This nightmare choreography positively hurt. It was unreasonable (or so it seemed) and the preoccupied observer could not watch the orderly passage of clouds and strata and the apparent movement of colour.

Perhaps the loveliest arrangements of colour seen on the Treshnish Isles where, on

John Ma

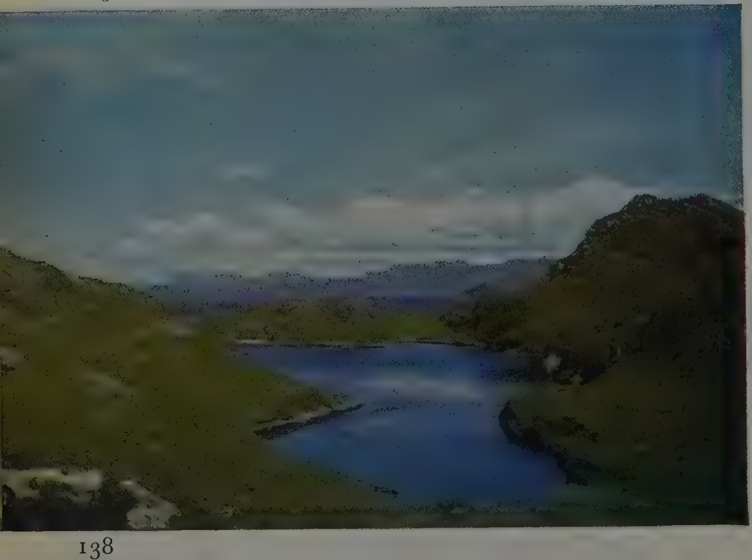
The beauty of isolated birches in the Spey Valley, where wind conditions are not too hard for a spreading development of the tree. The drier climate allows the silver of the bark to be expressed. Early autumn is thinning the leaves and matching them with the ochreous herbage the whole, the hues were softer than in the sharper country farther north, were in the evenings of a calm November. I used to sit on the Cruachan looking south-westwards to Dhu Artach and Skerryvore, and sunwise as far as the southern end of the Outer Hebrides. The principal colour was violet, the distant specks of land deep violet, the sea and sky of the horizon less deep, then strata of sea and sky which might have a flush of rose. Only the sky immediately overhead and the sea beneath would be blue. One would turn away with regret, yet to stay and see it fade into darkness would have been anticlimax.

There are other days in May and June in the north-west when sea and islands may be viewed from on shore with a brilliant sun to the south. "Could you paint this whole landscape entirely in blue?" I asked an artist friend of mine. "Almost," he said, "except for minute touches of red." To me, accustomed so long to the Torridonian sandstone, only the blues of sky and sea and island seemed significant, but I could find the touches of purple-red rock by looking specially for them. On such days of brilliant blue I used to visit some of the outermost islets and skerries of the Summer Isles. Their own colours would then rise up from the sea as one steered towards the cliffs. I know nothing in the Highlands and Islands of greater brilliance than these small isles in the sea, except June on North Rona where almost the same conditions are found. The rock is red, its seaward vertical side is suffused with the grey-green of goat's-beard lichen. Horizontal or slightly inclined surfaces are covered with a rich saffron lichen. Then, when the growth of higher plants begins there is the wealth of sea pink, the whole range of colour between white and purple. The green of the sward is emerald in its newness, so that one almost hesitates to tread. The hemisphere of sky and sea is of one blue, immense. By August the scene has softened, for the saffron lichen has dulled and the sea pink has gone, but the sward now on Glas Leac Beag is blue, the soft blue of sheep's-bit scabious. One cannot compare these phases of loveliness. To say they are breathtaking is too common and melodramatic usage.

The picture below was taken at the western end of a small freshwater lochan on Priest Island, looking eastwards. I was looking there one such day in June delighting in doing nothing more than see. The colour photograph cannot show what I saw, for neither its eye nor yours see with my individual vision. I was looking near and far. About me in the green were bluebells, remnants of a golden age of island woodlands. Blue butterflies came to rest or flew among them. There was the blue of the freshwater lochan, the different blue of the sea and the ineffable blue of Stac Polly 13 miles away on the mainland. And above all the blue sky. There were tiny spots of red on the underwings of the butterflies, there were patches of red rock on the winged sides of my little glen. There was green round my head and feet, but all else shone with blue.

The picture opposite shows a scene on the south-western *machair* of Tiree, the strip of natural grassland on the blown shell sand

F. Fraser Darling



A freshwater lochan on Priest Island, north-west Ross-shire, in high summer. Suilven, Canisp, Stac Polly and Cul Mor can be seen in the background, across several miles of sea. The author, who took this photograph, considers that it shows well the differing blues of fresh water, sea, distant hills and summer sky

An Atlantic shore of Tiree, outermost of the Inner Hebrides. The cream-coloured sand, consisting solely of finely-broken shells, is blown up from the sea and, above high tide mark, forms a ramp of dunes. On the landward side of the dunes is the machair, *a natural sandy grassland where a wealth of flowers blooms in July*

F. Fraser Darling

facing the Atlantic. It is a good day of sun and light westerly breeze after rainy weather. The blues of sky and sea are very deep of their kind with thin streaks towards the horizon which are almost indigo. But the dramatic quality is where land and sea meet on the superb stretch of shell sand. Shell sand is just finely-broken shells—cockle, mussel, periwinkle and many another marine mollusc. Its colour is not white but cream, a fine warm cream of matt surface. The quality of light is intense. Beyond the arc of white breakers the sea is almost jade green, its blue tempered by the cream sand below until depth hides the light of the sand. How surely is this green not a yellow- or a grass-green! One has not far to look for comparison because Tiree's soil is almost all affected by the calcareous shell sand and grows the greenest of grass. The whiteness of the crofts of Tiree picks up with the whiteness of the ever-breaking wave. Nothing else is white but the plumage of the little tern which nests on the small blown deserts among the dunes.

Another scene of shell sand, *machair*, bog and hill which I carry in my mind is that of Uig Bay on the west coast of Lewis, standing above the crofts of Crowlista on the northern arm of the bay and looking south-eastwards. Choose a good day so that the mile of cream sand may give its light; beyond is the lime-enriched crofting land of Ardroil showing a vivid green. This is the work of Atlantic weather casting up the particles of shell sand onto the peaty soil of the island and ameliorating it. There is kindness in the storm. Beyond this belt of green is the olive expanse of bog reaching to the foot of Suanival, which rises indigo blue and rocky from the plateau. The sky will inevitably be good, flecked with grey-soled white clouds. It is Highland country still, but how far away from that winter deer forest of purple birches. The Outer Hebrides are indeed a different land. Some of the finest contrastings of black, green, white and blue may be seen in north-westerly weather in spring when the atmosphere is sharp and clear and electrical disturbance not uncommon.

This leads me for a moment to think of the aurora borealis as seen from the Highland coasts. It is often vivid, but not with the variety of colours seen in some other regions. If you can watch it in the north-east to a clear horizon and then turn southwards to the light of a full moon you will be surprised and comforted by the mellow light of the moon. The aurora is steely, unstill, less familiar.

Except for the blue butterflies and the bluebells our eyes have gazed afar in this essay. But on the *machair* in July they may look no farther than our feet to its transitory blossoming. Now is the time of flowers, and so many of them—the pink of centaury and bog pimpernel, the large flowers of bloody geranium, bird's-foot trefoil almost orange and touched with red on the keel petals, germander speedwell and many another. If the *machair* is overgrazed with sheep the flowers do not come and once more the seeker after the beauty of colour must look afar.

Post-War Siam

by FRANK OUTRAM

THE second atomic bomb brought about the immediate collapse of Japan, and Allied forces assumed control of all Japanese-held territories. Our troops occupied Siam, or Thailand as it was then called, in September 1945. The great majority of these troops, who knew nothing about Siam beyond, perhaps, the schoolboy version of the Siamese National Anthem ("O-wa-ta-na-Siam"), were surprised to find, tucked away in this corner of the Far East, a modern civilized city —and one but little damaged by war.

Bangkok, raided frequently by long-range aircraft from India, was bombed with great accuracy. There was very little damage to residential property, though military objectives, such as bridges and power stations, had been hit. The city's services were, therefore, somewhat disorganized on our arrival and the people's obvious relief that the war was at last over, without serious damage to their beautiful and beloved city, showed itself in fulsome welcome and cooperation. Theirs was not the demeanour of a conquered foe—rather that of welcome to a saviour. A general air of gaiety prevailed, and the shops, restaurants and dance halls displayed their wares to the war-weary victors. Pre-war Japanese silks and Siamese silver for those back home, luscious Chinese dishes and a Siamese, Chinese or what-have-you little hostess for more immediate entertainment dazzled the eyes of officers and men. The news got around and troops stationed in Burma, Malaya and even India inquired tentatively about leave in Bangkok. But Siam was not open as a leave centre—it was an enemy country; we were still at war with Siam.

Civil and military administrators proceeded with their duties towards a satisfactory settlement with the Siamese Government, whilst the people vied with each other to be nice to their former enemies. Princes and princesses, who abound in Siam, entertained Allied officers in a wholly delightful combination of modern usage and ancient custom. They asked us to tea, they invited us to cock-

British officers, welcomed to Bangkok, are guests at a luncheon at the Ratnakosinder Hotel, arranged by Professor Vaivitt of the University of Moral and Political Sciences (extreme right)

tographs from the author

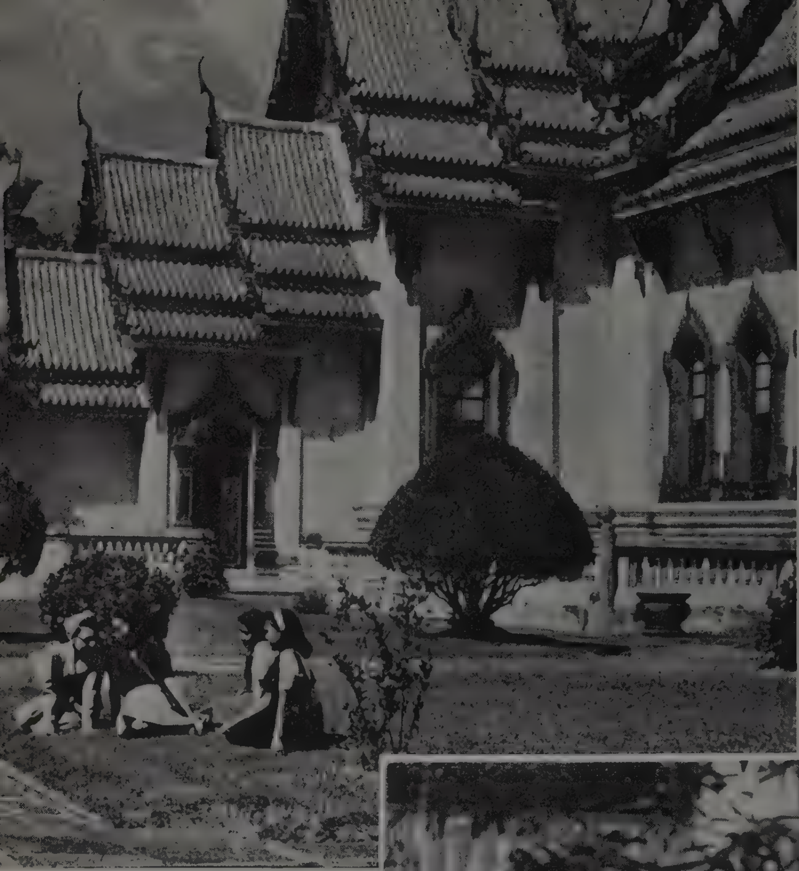
Rajadamnoen Avenue, Bangkok, unscathed by the war, impresses strangers by its spacious modernity. Western and classical Siamese architecture are blended in the winged Monument to Democracy (1941)

tail parties and to dances at the Thai Officers' Club.

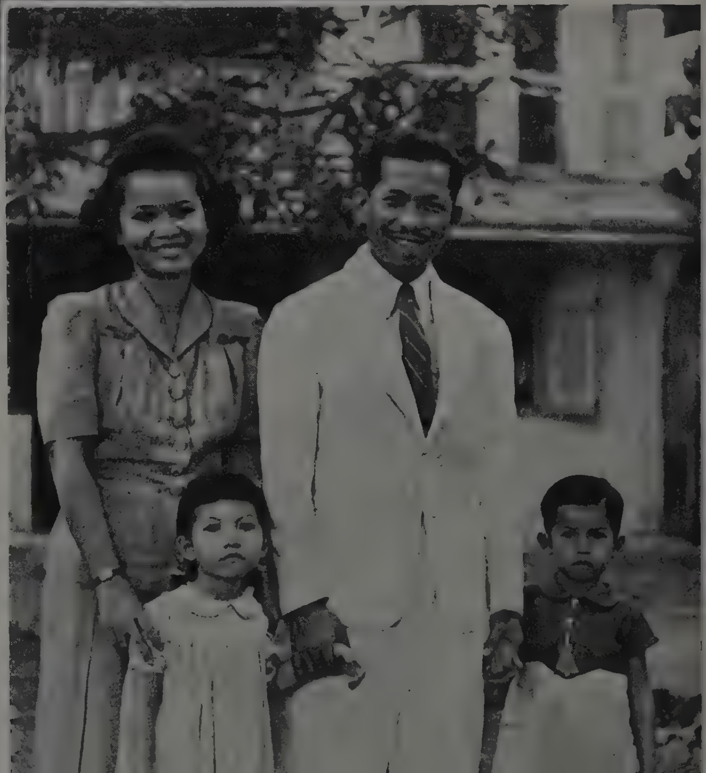
Their houses, furniture, food and drink were such as Western people know and use, but to sit on a chair and cross your knees raised a Siamese eyebrow, though your host was too polite to comment. For in Siam it is very rude to draw attention to a foot, and to cross the knees raises a foot and obviously draws attention to it. The maid-servant who brings round a tray of drinks, shuffles in on her knees. To us this may seem ludicrous, but to the Siamese it is an old custom and no more comical than our old custom of shaking hands on greeting a friend. The Siamese greeting is also different and most gracefully performed: the palms are raised to the side of the face and placed flat together; at the same time the head is slightly inclined forwards.

We met one evening in Bangkok a Professor Vaivitt, from the University of Moral and Political Sciences. The Professor was very pro-Ally, and showed his anxiety to foster friendly relations in a peculiar but practical manner. He produced and introduced former students from his Co-ed University for dinner and dance parties given by Allied officers. Needless to say the demand for lady students compared with requests for male students was in the percentage of 100 to nil. We had more than one most excellent and friendly party arranged by the Professor, who always took the head of the table and acted as interpreter when the conversation became too involved. Though all the princes and princesses we met spoke English faultlessly or fluently, not many of these young students knew enough English to carry on a normal conversation.

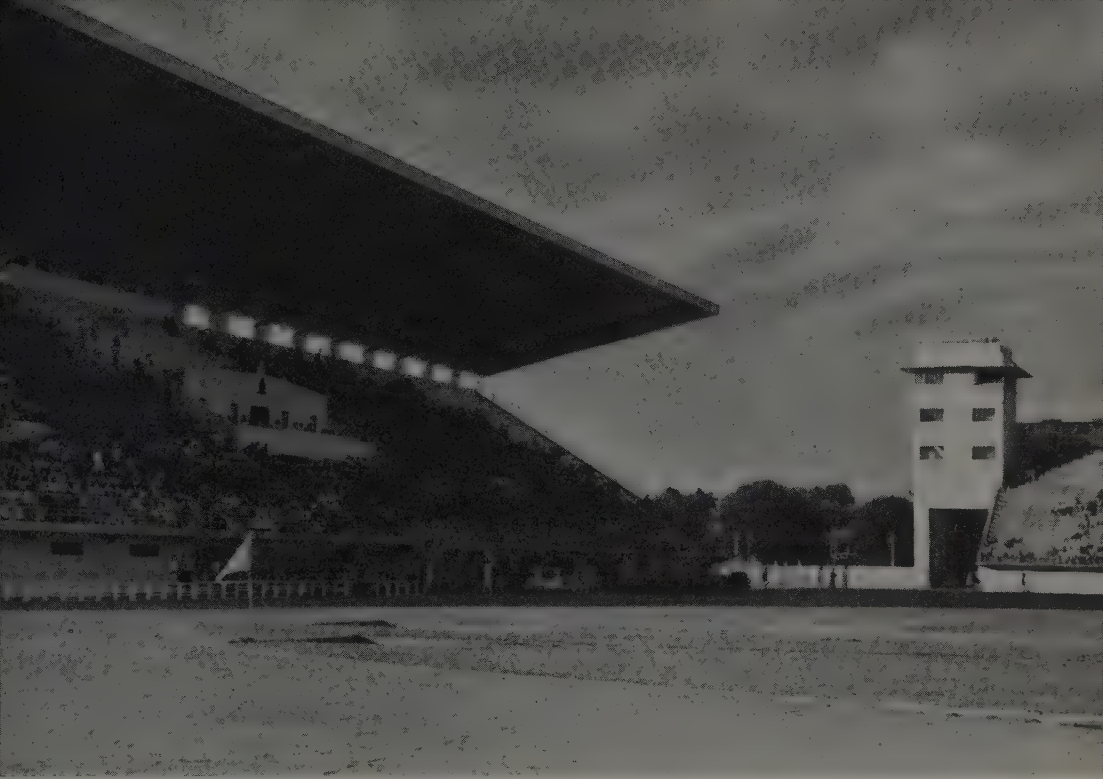
The Professor's salary was a meagre pittance, as he once confessed to us. We were shocked and at once offered to help in return for his kindness, but he steadfastly refused everything except cigarettes, which, at the time, were fantastically expensive—one shilling and sixpence each—and quite beyond his means. Thanks to Mr Dalton, cigarettes in England are now 2d. each. What would we do if they rose to 1s. 6d.? And yet



In architecture, as well as in life, outlook and general culture, Siam combines modern with ancient native elements. This Buddhist shrine at Bangkok, the Benchamabopitr Wat, although recently built of white Italian marble, is mainly in the classical Siamese tradition, from which it derives its curved porcelain-tiled roofs surmounted by gilded snake emblems



A Siamese prince with his princess and two children in front of their house in Bangkok. There are three degrees of princes in Siam: those of the royal blood; second cousins of the royal family; and third cousins of the royal family. The total number of princes is consequently large, but all show royal breeding in their charming manners and their unfailing courtesy



(Above) *The Bangkok stadium, where the high standard of Association football owes much to the skill engendere by a native form of the game.* (Below) *The late King of Siam, Ananda Mahidol (mysteriously assassinate in 1946), sitting in the stadium royal box with his younger brother, Bhumibol Adulyadej, the present kin*

in Siam, those who could afford them went on smoking.

FOREIGN INFLUENCES

The history of Siam as an independent country begins towards the end of the 13th century A.D. Before that many invasions had taken place and Indian immigrants had brought with them the Hindu and Buddhist faiths; of which the latter now prevails, claiming 95 per cent of Siam's 15,000,000 inhabitants. In A.D. 1350 the first truly Siamese king of all Siam established the capital at Ayudhya, where it remained for 417 years. One of the most famous of the kings who ruled from Ayudhya was Phra Narayana Maharaja (A.D. 1658 to 1688). Many people have seen the film, *Anna and the King of Siam*. This picture gives the impression that an English nursery governess guided two Siamese monarchs along the straight and narrow path, and was largely responsible for emancipating and modernizing the country. This is cinematic license, but in Phra Narayana's reign a Greek adventurer named Constantine Phaulkon really did so influence that far-sighted king that he became Prime Minister. Diplomatic relations were opened with France and embassies exchanged.

The Burmese and Siamese periodically invaded each other's territories. In 1763–7 the Burmese invaded Siam and utterly destroyed rich and beautiful Ayudhya. After vicissitudes a Siamese general, Phra Chakri, founded the present Chakri Dynasty, styled himself Rama I, and transferred the capital to Bangkok. It was during the reign of Rama IV (Maha Mongkut: 1851–68) that the widow Mrs Owens arrived at the Royal Palace to teach the king's family. Relations with foreign countries were regulated by treaties and Siam began to catch up with civilization.

Rama V (Chulalongkorn) carried on his father's work. He was probably Siam's greatest reformer. In all departments the old feudal systems were modernized. Debt slavery was abolished; in 1885 post and telegraphs were organized; in 1891 railway construction began.

Succeeding rulers added further reforms. In 1932 a *coup d'état* changed the government from an absolute monarchy to a constitutional monarchy. King Rama VII (Prajadhipok) abdicated and was succeeded by a child (Prince Ananda Mahidol), and the name of the country was changed to Thailand, "Land of the Free".

War engulfed South-East Asia in 1940 and swept the happy-go-lucky Thailanders with it. The Japanese saw Thailand as a convenient springboard for their attacks on Malaya, Burma and India. Thailand was told to declare war against Britain and the U.S.A.—or else. The Japanese treated their Allies with scant courtesy, going where and when they pleased. There is no doubt that, had they won the war, Siam would have become a vassal state.

PEACE IN BANGKOK

On January 1, 1946, a peace treaty was signed at Singapore and the name Siam was re-established. New Year's Day in Siam is ordinarily a day of great ceremony; in 1946 it had the added joyous ceremony of the signing of peace.

All officers and officials, in dazzling white and gold uniforms, presented themselves at the Royal Palace and signed the visitors' book. We also were asked to sign the book but refrained politely until we heard the news officially later in the morning that peace had been signed. As we wrote our names in the book we were presented with a small red and gilt Siamese Diary and the ceremony was over.

Included in that Peace Treaty were clauses concerning the export of Siamese rice to countries sorely in need. Siam was one of the world's largest exporters of rice before the war. She had accumulated stocks and her rice fields had not been ravaged by invasion as in Burma. In return Siam would import again manufactured commodities she had not seen for some years.

The month of June 1946 was marred by the mysterious shooting of the boy King, Ananda Mahidol. In the autumn of 1945 we had brought him back to his country from Switzerland, where he had remained as a student throughout the war. His younger brother, Bhumibol Adulyadej, who is very like him in appearance, is now King of Siam. The new King is only 18 years old and has recently returned to Switzerland to continue his studies.

The modernization continues slowly and under wiser guidance than in the years before the war. Siam has an important part to play in the exchanges of the maritime world and desires only amicable relations with her Eastern neighbours and her Western friends.

ANCIENT AND MODERN

Siam has her foundations deep in ancient ground, but there is a show window of modern civilization, which is enthusiastically pre-

New Year's Day is always festive in Siam, but January 1, 1946, date of the official ending of war between Siam and the Allies, provided an occasion for special ceremony as officers and government officials in dazzling white and gold uniforms called at the palace to sign the Royal Register

sented to the foreign visitor. The minority who have prepared and operate this show window are an important minority: they are the ruling classes—the princes, politicians, teachers and students. They are the people who influence the masses. This modern window in the front room is wide open: air is blowing in all the time and filters slowly through the house. For instance, a gigantic office of Information and Publicity, situated on Bangkok's sumptuously broad Rajadamnoen Avenue, has great plans; only shortages of paper and machinery are holding up the spread of these plans throughout the country.

I met the Director of Publicity, who gave us a magnificent Chinese luncheon. Chinese restaurants, notably the Hoi Tin Lao, provide the best food in Bangkok. The Director spoke to us through an interpreter and detailed one of his officials to look after me for the next few days. This gentleman spelt his name on his visiting card Bairaj, but pronounced it to sound rather like Pirate, so Pirate he became. We also met his little daughter, aged seven: her name was Ching Chai . . . like a little peal of bells: she was very sweet and the name suited her.

Pirate agreed with us that Siam, like Japan, was a mixture of ancient customs and superstitions with a rapidly growing modern civilization. We Western nations are the same; we cling fondly to many old customs and beliefs, especially in country districts. The only difference is that these modern Eastern nations are more influenced by their ancient culture; they have not yet thrown off the old yoke; their old beliefs are still the vital factors in their lives. The metamorphosis is a slow process: the pages of history show us that attempts to hurry it have usually resulted in chaos and bloodshed. Japan's recent Greater East Asia plan was such an attempt to speed the change.

Pirate took us round the city. One of the best examples of the mixture between ancient and modern Siam is the Benchamabopitr Wat (The Marble Temple), a recently built shrine, where old and new styles of architecture are perfectly blended. This beautiful shrine is built of white Italian marble. Its roofs are covered with glazed yellow tiles, surmounted by gilded snake-emblems.

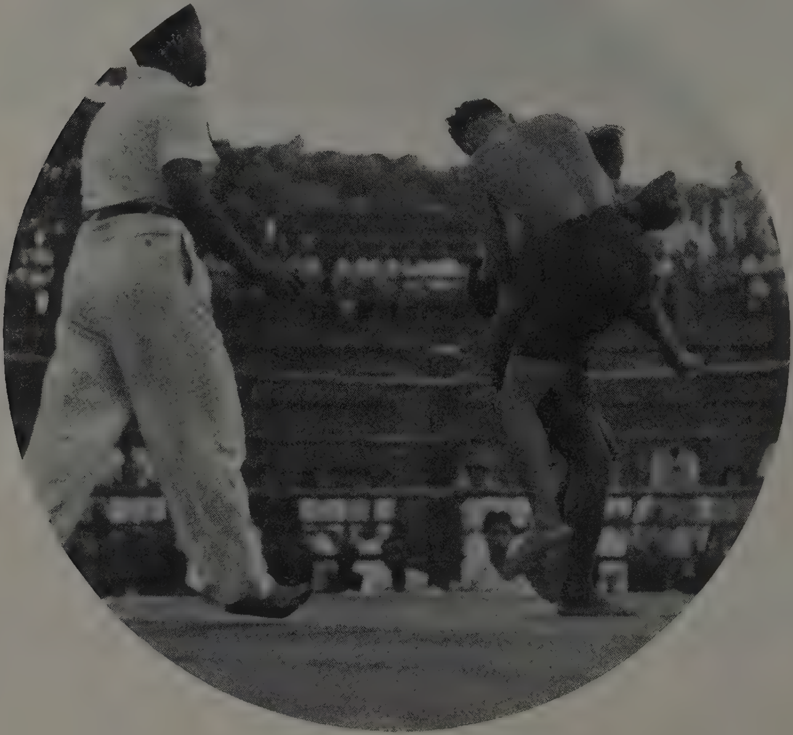
Through Bangkok run several broad avenues. The finest is Rajadamnoen Avenue, in the centre of which stands Siam's Monument to Democracy. This edifice, like other buildings in the city, is composed of a mixture of ultra-modern and classical Siamese architecture. We were admiring this great monument and I turned to Professor Vaivitt, who was with us at the time, to ask what he understood by Democracy. The professor of Moral and Political Sciences thought a moment, and then replied that he had no ideas on the subject. However, it is a most impressive monument, with great wings stretching up into the empty sky, as if about to take off . . . where to? . . . Ask the professors.

ON WITH THE DANCE

One of the most interesting ceremonies to which I had the good fortune to be invited was the 60th birthday party of a well-known figure in Bangkok society. He prefers to remain anonymous but the occasion was typical and provided an excellent example of the marriage between Siamese modern life and ancient custom.

Every twelfth birthday in the life of a Siamese is important and marked by as big a party as he can afford. The 60th birthday of a rich and well-known official in Bangkok meant a very big party. About 2000 of the 1000 invited guests turned up—a custom not confined to Siam—and consequently the food and drinks soon ran out. This did not appear to distress the guests unduly, many of them staying on to breakfast, which the eldest son had procured. It is a custom of these parties that the eldest son makes all the arrangements; the honoured host does nothing except attend . . . and get honoured.

Side-shows and dancing entertained the



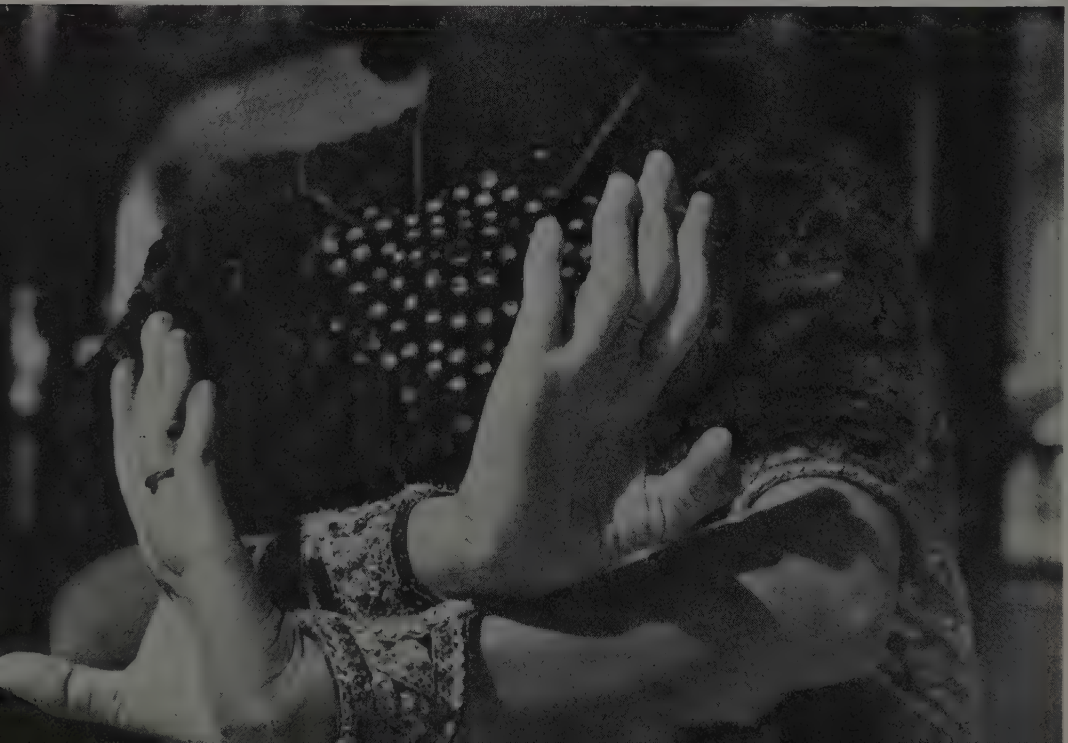
(Left) *This 'jump and knee kick' is part of the recognized technique of Siamese boxing, a popular national sport which includes much all-in wrestling.* (Above) *Equally popular are the combats of Ravana, the demon king, and Hanuman, the monkey god, in the classical dance based on an ancient Indian legend, the* Ramayana guests. At midnight classical dancers enacted scenes from the life of the host and sang verses in his praise. The old man sat in a high chair facing the dancers; tears poured down his cheeks as they conjured up memories from his honoured past. It was rather pathetic to watch him, because nearly all his guests were at the side-shows or sitting out on the balconies, paying no attention to the most interesting ceremony of the whole party. I asked a young princess I was sitting near what these dances meant. She shrugged her pretty shoulders, "I do not know. I'm not interested in those old ceremonial dances . . . they're rather tiresome and childish."

But there are plenty of Siamese, especially among the classes less affected by Western ideas, who do not share this view. There is a Royal Dancing Academy in Bangkok, where classical dancing is taught. Trainees are young girls, who go to the Academy at the earliest ages, and it is many years before they are considered proficient. Siamese classical dancing is impossible to appreciate and understand, unless one knows the meaning of the various finger, hand, arm and body movements. The face remains impassive, or is covered by a mask, and each mood is shown by gesture. This form of dancing emanated from India. For instance the Siamese version of the 2000-year-old Indian epic, the *Ramayana*, is the background for many of the dances.

An interesting hybrid of Siamese classical dancing and modern ballroom dances has found its way into Bangkok and Siamese society, as a result of the modernization of the country. This dance is called the *Ram-Wong*. It was introduced by royal decree, to mark the cultural advance of Siam, and all officials were obliged to learn it . . . and to dance it in modern ballrooms as a social accomplishment.

The Ram-Wong has since become very popular, and there are always two or three Ram-Wongs in an evening's programme at the Thai Officers' Club and the local dance halls. It is quite easy to learn but not at all easy to perform gracefully. We tried it out, and anything more ludicrous than a large British officer, muscle-bound and stiff in every joint, dancing the Ram-Wong with a supple little Siamese princess would be hard to find—it was like a Hippo and a Humming-bird.

The amazingly supple hands of a Siamese classical dancer play a major role in interpreting story and change of mood, for the performer's face remains impassive or is covered by a mask. Despite modern influences the classical dances are still a live element in the pattern of Siamese culture



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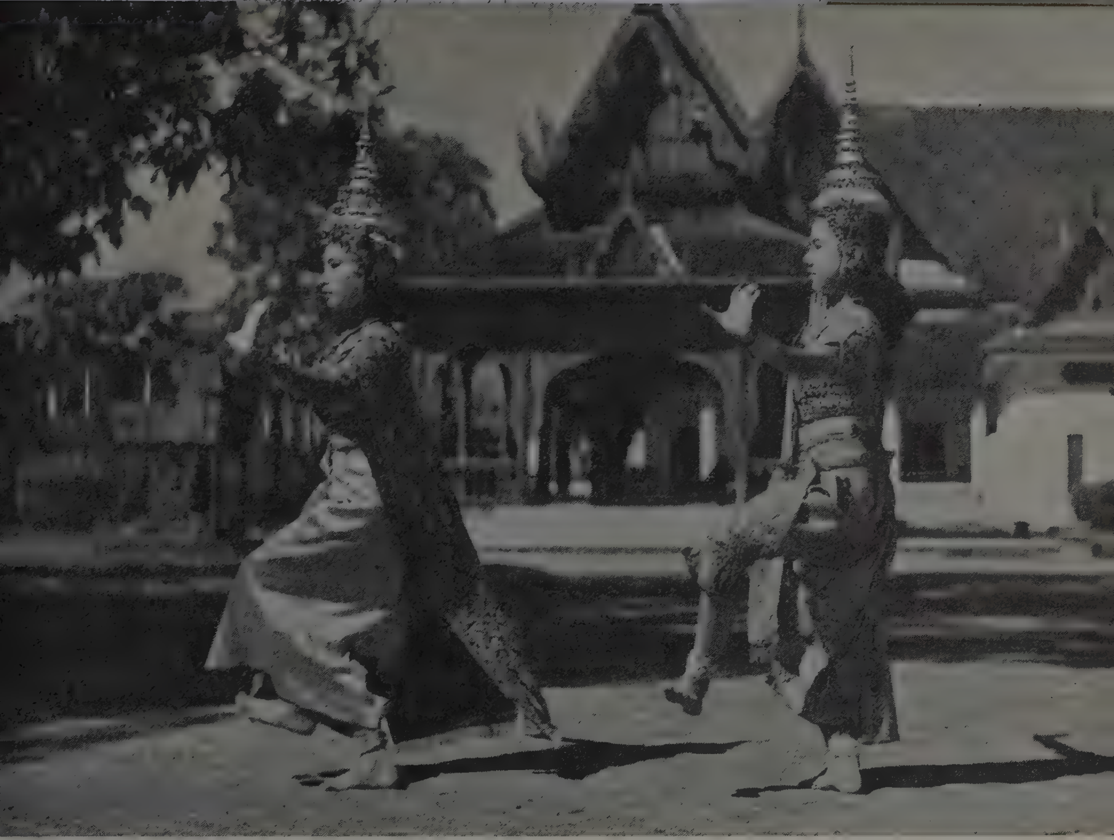


Students at Bangkok's Royal Dancing Academy wearing the stylized costume required for Siamese classical dancing. These girls are trained from an early age over a period of years to execute expressive posturings and gestures, the meaning of which would escape an uninitiated audience

In the Ram-Wong hands and arms reproduce the pliant movements of classical dancing, whilst the feet keep time to the slow rhythm of the music. The dancers do not hold each other; in fact no contact is made throughout the dance, though all movements must be similar and in unison. This requires a keen sense of anticipation and, to put it bluntly, needs a bit of doing.

We had the good fortune to see the Siamese Dancing Championship Finals at a big dance on New Year's Eve. The Waltz and Fox-trot finalists could have reached the finals in any dancing competition in Europe. Our host, who was one of the judges, confessed that he and his wife had won a dancing championship in Bournemouth before the war! But the most fascinating event of the evening was the finals of the Ram-Wong Championship. This was particularly interesting because one pair were dancing in perfect reproduction of true Siamese classical dancing, whilst the other couple, though keeping to Ram-Wong rules, mixed modern fox-trot and jive steps with their Siamese arm movements. Each couple was extremely graceful and held the audience enthralled, but we were all pleased when the judges awarded the first prize to the strictly classical pair.

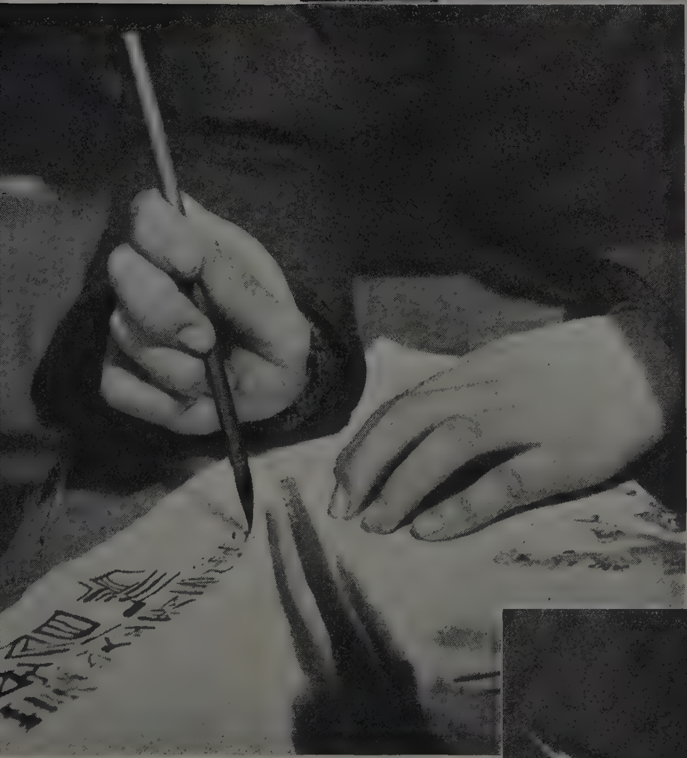
Life in this happy little country is of course not all rosy and Ram-Wong; but Siam has come through a terrible war comparatively unscathed, even though she was on the wrong side. Her good fortune and her friendly attitude towards the Allies give her every opportunity to make the best of her position in this diminishing world. For Siam is no longer a far-away backwater of myth and legend. Rapid transport of ideas and people forces her into contact with all countries, and she has bravely accepted the resulting challenge. She retains the strong foundations of her ancient culture and has built upon them a lovely house—modern Siam.

A Chinese Artist

Notes and Photographs
by HEDDA MORRISON

The artist pauses from his work. Mr Wang Ching Fang lives in Peiping where he is best known for his woodcuts and seal carvings. In these arts he gives instruction at Peita University. He is also a painter of distinction, having evolved a style of his own which is characterized by great simplicity and economy of brush work. His favourite subjects are birds, fish and flowers, which he paints, however, not from actual models but direct from his imagination, without making any preliminary sketches

Mr Wang, his wife and two children occupy a small house where one room serves as kitchen, bedroom, nursery, living room and studio. The children play at their father's feet as he works, but such distractions do not prevent his creating masterpieces of beauty and fine craftsmanship. Diffident and retiring, Mr Wang lives for his work alone and has never achieved a popular success



(Above) *One stroke of a large brush suffices for the fish's body; then fins, eyes and scales are added by a few strokes with smaller brushes.* (Left) *Mr Wang adds the title to a completed painting and signs it with his seal. The title and its calligraphy are an essential part of every Chinese painting, and are usually very flowery; a quotation from the classics is often used*

(Right) *Cutting a seal. Seals are of great importance in China, being the normal means of affixing signatures. Each carries the characters of the name of the firm or person to which it belongs; a pronounced individuality in the styles in which seals are carved makes them very difficult to fake. Every artist has two—one giving his name, the other his qualifications*

Exploring the Deep Sea II

by Dr F. D. OMMANNEY

In our April number Dr Ommanney reviewed the great voyages connected with the earlier development of oceanography. He now surveys recent progress and some problems which confront oceanographers in their "systematic study of the sea as an environment for a rich and varied living population"

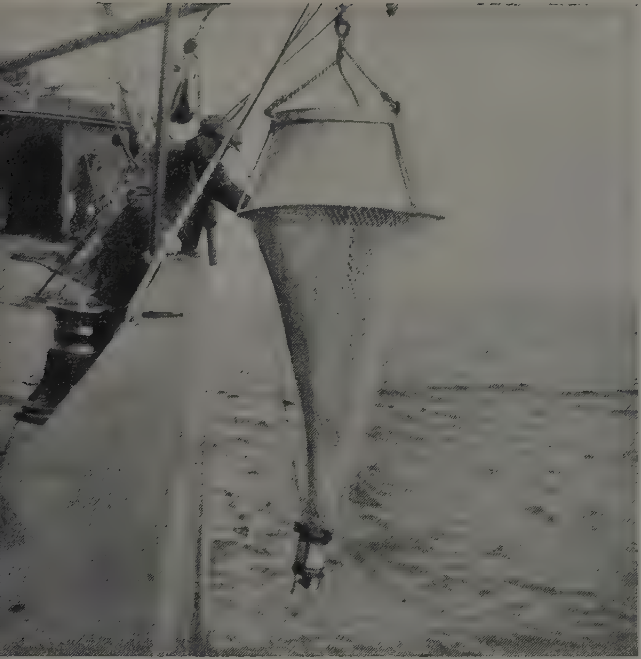
The great oceanographical voyages of the 19th century, of which that of H.M.S. *Challenger* was the most famous, were mainly charting and collecting expeditions. They sounded over the bottom of the ocean and made observations on the physical and chemical properties of sea water at fixed stations which were necessarily rather widely spaced both in time and position. They brought back enormous collections of marine animals which, again necessarily, were dead—pickled in formalin or spirit. They did not much advance knowledge of the living animal in its world, the sea. They threw little light on the periodic changes which take place in the sea and its population. And these were becoming more important every year, especially for us in these islands, in connection with the sea-fishing industry whose problems were beginning to cause much concern. The study of this aspect of the sea and of its life required quantitative treatment and repeated routine observations taken at definite regular intervals in the same place for many years.

Quantitative methods were first applied to oceanography in 1889 by the German biologists of the Kiel school, Hensen, Apstein, Lohmann and others. Their so-called "Plankton" Expedition to the Atlantic in the ship *National* used nets of fixed dimensions with carefully graded meshes which could be opened and closed at depths determined beforehand. The dimensions of the water-column filtered were therefore always known. This was a great step forward, for it made possible estimates of the population of the seas in different areas and at different times. But in order that repeated routine cruises could be made across areas kept constantly under observation, the establishment of biological laboratories ashore, from which such cruises could operate and which could act as bases, became a first necessity. Here, too, animals could be easily kept alive and watched, and scientists could work close to plentiful supplies of fresh material. For dead material was of use only to museums for cataloguing, classification and anatomical examination.

The first great marine biological station of this sort was established in 1872, the year the *Challenger* sailed, by the German zoologist Anton Dohrn. This was the Stazione Zoologica at Naples which, with the support of the German and Italian Governments, remained the leading institution of its kind for many years. Famous naturalists from all over the world came to work in its laboratories on the superb fauna of the Bay of Naples, amid surroundings of matchless natural beauty; and tourists came to gaze at the living marvels in its aquarium, for long the most celebrated in the world.

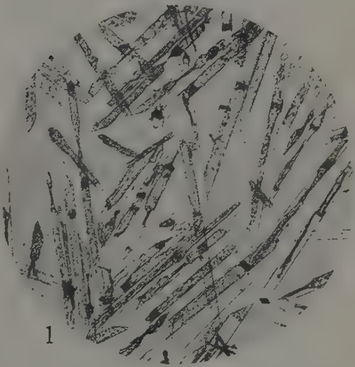
In Britain Sir John Murray may be said to have begun the movement for the establishment of marine laboratories. In 1884 he acquired the lease of an old sandstone quarry near Granton on the Firth of Forth. The sea had burst into it and left in it a large land-locked sheet of water which rose and fell with the tide. Here he moored an old canal barge on which he built a wooden house containing a biological and chemical laboratory. This he called "The Ark" and here he carried out a good deal of work on the chemistry of sea water. Eventually he had The Ark towed through the Clyde-Forth Canal to Cumbrae Island, where it became an annexe to the Millport Marine Biological Station, opened in 1897.

But it was the sea-fishing industry which gave the real impulse to the foundation of these stations all over the country. In the 'eighties the steam trawler began to replace the sailing vessel on the North Sea trawling grounds and the beam trawl gave place to the otter trawl—a far more ruthless and efficient instrument. The inshore grounds of the North Sea began to be depleted and gradually the trawlers had to sweep farther and farther afield for their catches. At the International Fisheries Exhibition in 1883 a conference was held at which the fishing trade expressed its fears for the future of the industry. An alarming destruction of young fish was going on. However, T. H. Huxley, in his inaugural address to the Fisheries Exhibition, said: "I believe, then, that . . . probably all the great sea fisheries are inexhaustible; that is to say, nothing we do seriously affects the number of fish. And any attempt to regulate these fisheries seems, consequently, from the nature of the case, to be useless." Nevertheless, the



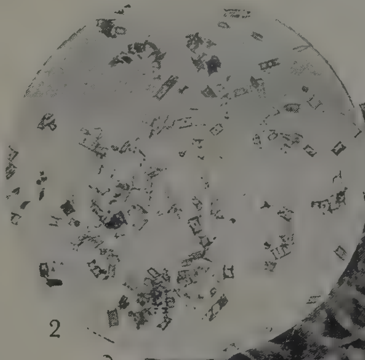
Ministry of Agriculture and Fisheries

Plankton, the drifting life of the open ocean, is of two kinds: plant or animal. (Left) *Making a vertical haul with a silk plankton net. Samples are collected by means of conical nets of coarse canvas or fine silk according to the type of specimens required. The nets can be closed at any depth by sliding a weight down the wire so that they can be made to fish through water layers of known dimensions*



1

Plant plankton (1 and 2) consists argely of diatoms, single-celled plants with skeletons of very dierse patterns. Animal plankton, owever, comprises a vast assemlage of different classes. Sample 4) contains young fish, crustacea, rrow worms, jelly-fish, fish eggs, tc.; while (3), seen by transnitted light, includes both plant nd animal plankton, the large lark spheres being fish eggs



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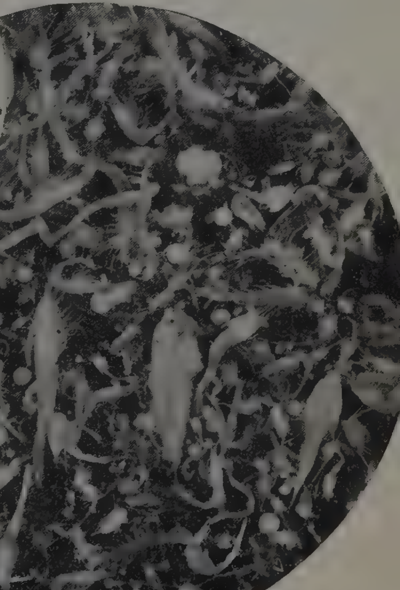

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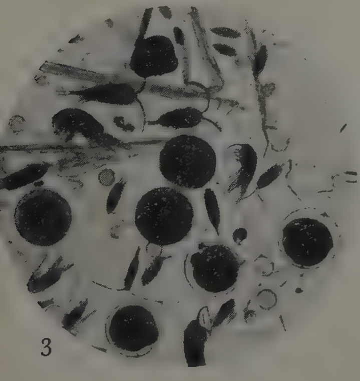

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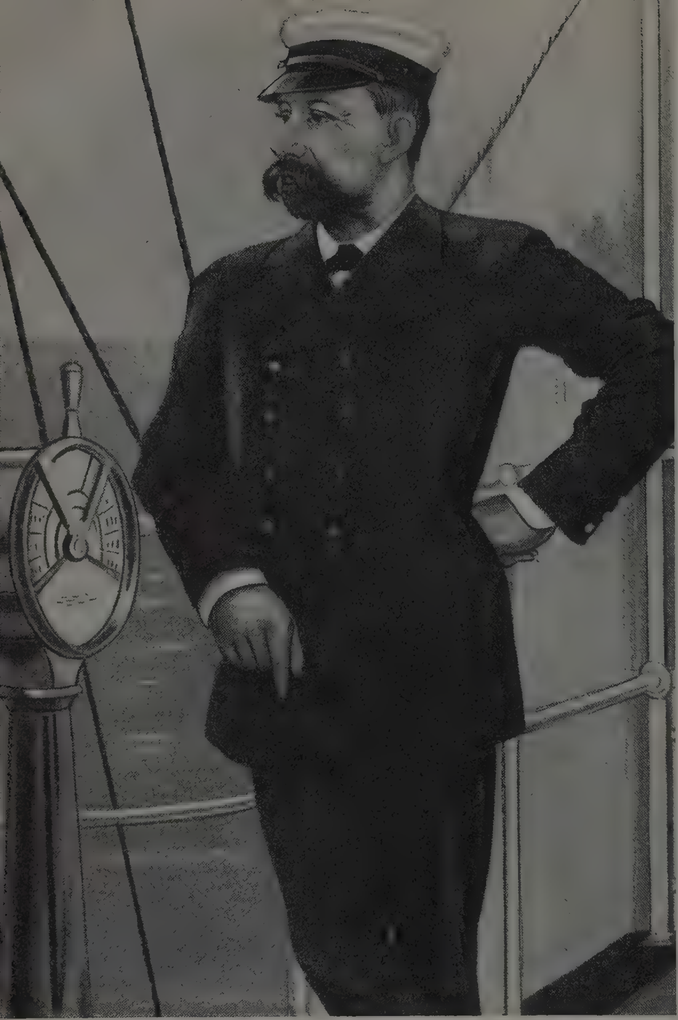

The Prince of Monaco, a pioneer in deep-sea exploration at the beginning of this century, founded the Monaco Museum of Oceanography and made extensive collecting voyages in his two yachts

fishing trade and the younger scientists present were not reassured and their demands grew for the regulation of the industry and for research into the biology of sea fishes. At the same time in Scotland a Royal Commission, under the advice of Professor W. C. McIntosh, was inquiring into the effects of trawling. Under McIntosh's direction a marine laboratory was set up at St Andrews. In England, in the year 1884, the Marine Biological Association of the United Kingdom was founded with Huxley, in spite of his views, as its first president. The Association, with government funds, built itself a laboratory and an aquarium at Plymouth which have become world-famous and have done as much for the science of the sea as the Challenger Expedition did in a different way. Other marine biological stations and fishery research laboratories were later founded at Port Erin in the Isle of Man, at Millport in the Clyde, at Cullercoats in Northumberland, at Lowestoft and at Aberdeen. The work that has been going on at these stations during the past fifty years has been of great range and extent. It has included the study of living animals in their environment; careful watching and experiment with them in tanks; physical and chemical analysis of the sea water; as well as continuous routine observations designed to keep a check on daily and seasonal changes in local sea areas and their population. All this has kept our country in the forefront of this kind of research, so vital for a seafaring nation.

Yet the study of the European fisheries, the richest and most fertile in the world, must always be an international undertaking. Since the Middle Ages all the countries of northern Europe have fished over these abundant pastures and the proper study of them is something far outside the scope of any single government, even the wealthiest and most powerful. This was recognized at the beginning of the century when, in 1902, mainly on the initiative of the Swedish Government, the International Council for the Exploration of the Sea was set up at Copenhagen. All the governments which were members of the Council, chiefly those of Britain, Germany, the Scandinavian countries and Holland, agreed to carry out research, with their own ships and laboratories, into the problems of their own particular areas. The Council met each year, up to the outbreak of war in 1939, and at each meeting plans for research were co-ordinated and common problems were discussed. The work of the Council began modestly, and it was agreed that quarterly routine observations should be taken at fixed stations off the northern coasts of Europe so that seasonal changes could be observed. But as time went on and the field widened this programme grew, and more and more frequent observations were found to be necessary at more and more points. During the two wars of 1914–18 and 1939–45 the work of the Council was suspended, but plans are now well in hand to set it going again.

In the first years of the 20th century, up to the outbreak of war in 1914, perhaps the most attractive individual figure in marine biology was the Prince of Monaco—Prince Albert Honoré Charles Grimaldi. There was something pleasantly reminiscent of the 18th century about him and he seemed to resemble one of the princelings of the civilized Germany of that time who made their courts centres of art and music and were the lavish patrons of writers, artists and musicians. He was a man of great wealth and had a passionate interest in the study of the sea. He made his sunny little principality a famous centre of marine biology and founded there in 1910 his magnificent Museum of Oceanography. In his two yachts, the *Hirondelle* and the *Princess Alice*, he made cruises into the Gulf Stream, as far north as Spitsbergen and as far south as the Sargasso Sea, and into the Mediterranean. He made many improvements in the design of nets and trawls and at one time equipped his yacht for whale fishing. With the services of a Dundee whaler, especially engaged for the purpose, he captured Sperm whales and turned the beach at Monaco into a whaling station where he prepared the skeletons for his museum. What the people of Monaco thought of this manifestation of their hereditary ruler's passion for science is not recorded, but it seems unlikely that they were consulted in those easy spacious Edwardian days. They were, at any rate, obediently enthusiastic when the Oceanographic Museum was opened with lavish festivities and fireworks. The Prince also carried on for many years a long series of experiments with drift bottles. These were blocks of wood or sealed glass bottles, or even spherical copper vessels so made that they floated just below the surface so as to avoid the direction action of the wind. Each contained, sealed within it, a paper printed in nine languages requesting the finder to return it to the Museum at Monaco. Some 2000 of these were distributed in the Atlantic and, as a result, it became possible to draw up charts of the surface circulation.

In 1900 the Norwegian Government built and equipped for scientific work in the North Atlantic the famous research vessel *Michael Sars*, named after the 19th-century Norwegian zoologist who, with his son Ossian Sars, had been a pioneer in dredging work off the coast of Norway. Under the direction of Dr Johan Hjort, who is today one of the veterans of oceanography, the *Michael Sars* made systematic observations in the North Atlantic for a number of years and was the first ship to carry out routine work of this sort in oceanic waters. In 1910 she made a four months' cruise in the North Atlantic under the joint direction of Sir John Murray and Dr Hjort. Murray paid all the expenses of this cruise for which the Norwegian Government lent him the ship. It was Murray's last contribution to science before he died. The physicist on board was Dr Holland Hansen, who, by means of a new type of photometer, was able to demonstrate the depth to which light penetrates below the surface. He exposed photographic plates at various depths and found traces of light down to 500 fathoms in the Sargasso Sea, but between 800 and 900 fathoms he found no trace of light on his plates after two hours' exposure.

In the years between the two World Wars perhaps the main British achievement was the application of the methods of fishery research to Antarctic whaling. Early in the 20th century whalers had begun to turn their attention towards the south where, it was known, great herds of whalebone whales roamed along the pack-ice edge in search of food. For the northern whale fisheries were exhausted. The American and British open-boat whaling came to an end in the early part of the 19th century because ruthless over-hunting had all but exterminated the northern Right whales, the slow ungainly monsters which the whalers had been hunting mercilessly throughout the 18th century. The lithe swift Blue and Fin whales in the north had eluded the whalers until the invention of the harpoon gun in 1860. Then the Norwegians began the hunt for the Blue and Fin whales and pursued them ruthlessly from whaling stations in Norway, Iceland, the Faeroes and the Shetlands. But the whaling was quite unregulated and wastefully carried on, and by the end of the 19th century there was such a shortage of Blue and Fin whales in northern waters that the industry was once more threatened with collapse. In 1902 the first Antarctic whaling station was established on the island of South Georgia. By the outbreak of the war in 1914 the modern pelagic system was already beginning and the whalers were fishing farther south in the South Shetlands with whaling factory ships which, in those days, were old merchantmen, often in not very good condition, specially converted and fitted with cooking plant and storage tanks. These old ships remained moored to the beach in Antarctic harbours throughout the summer while their catchers went hunting in the open sea outside. The methods of whaling employed then were very wasteful, for only the

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bove) *The Royal Research Ship* Discovery, *Captain Scott's old ship, at Port Lochray, Wiencke Island,* *lmer Archipelago, during her 1926–8 oceanographic cruise.* (Below) *The biological laboratory of the Royal* *esearch Ship* Discovery II, *built in 1929 to carry on the work in the Southern Ocean begun by the* Discovery

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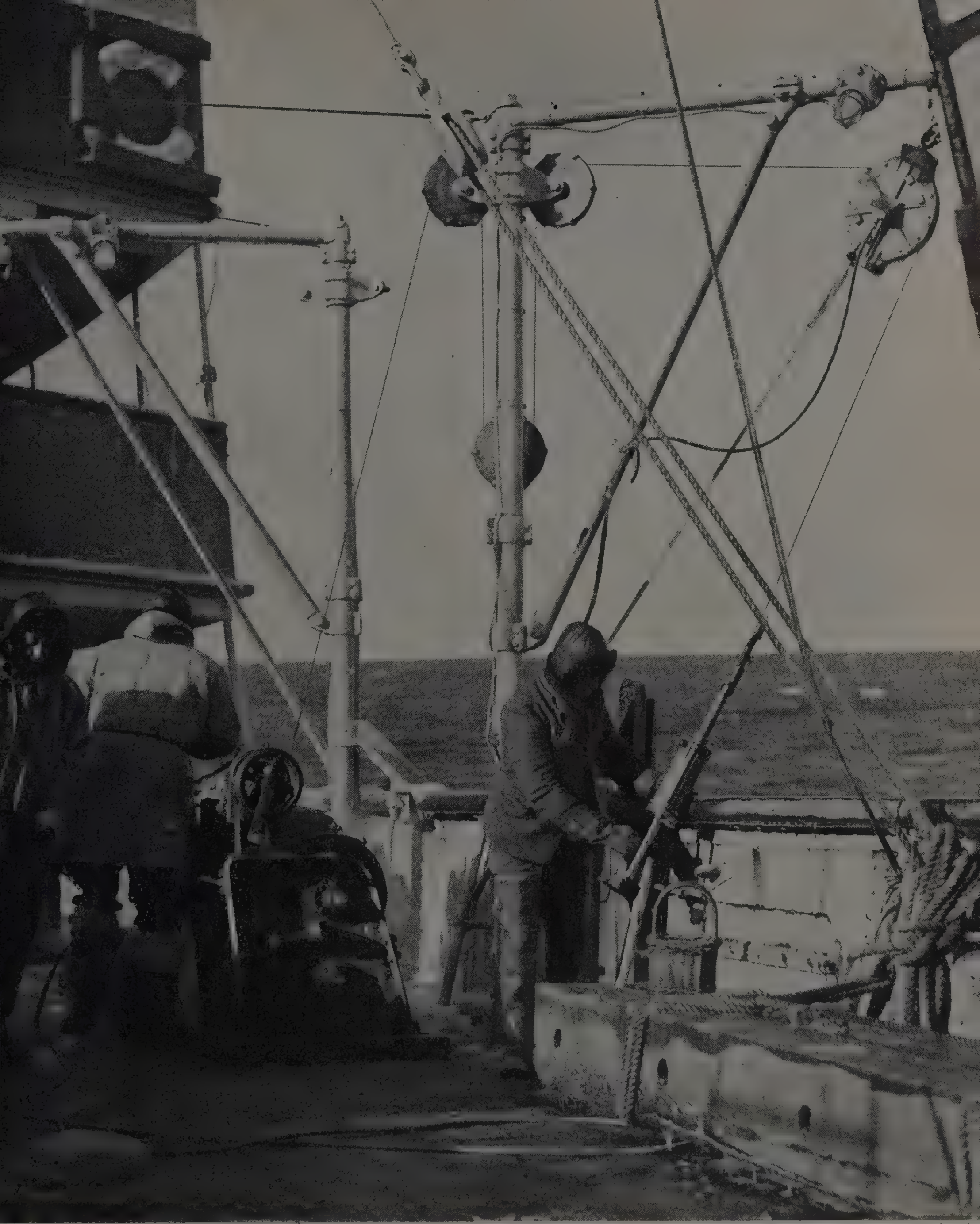


Alfred Saunders

Oceanographical research involves the collection and analysis of great numbers of samples of sea water from many depths, as well as the measurement of temperatures at those levels. The Nansen-Pettersen bottle shown in use for this purpose on Discovery II *is a steel cylinder with insulated walls and an enclosed thermometer* blubber was used and the rest of the carcase was cast adrift. To this day the shores of Antarctic harbours are lined with the bleached bones of whales killed nearly fifty years ago. Soon after the war modern pelagic whaling began and the factory ships no longer remained at moorings but followed the whale herds in the open sea. In 1938 some 30 or 40 up-to-date and specially built whaling factory ships were killing about 40,000 whales a season.

A large sector of the ocean in which this intensive whaling was carried on lies within the British Empire. A vast area of island-studded ocean south of South America is within the territory of the Falkland Island Dependencies, administered by the British Colonial Office. It was to study the biology of whales in this area, and at the same time the oceanography of the Southern Ocean, that the Colonial Office equipped and sent out to the southern regions in 1926 the greatest expedition since the cruise of the *Challenger*. A marine biological station was built on the island of South Georgia for the study of the carcases of whales at a neighbouring whaling station. Captain Scott's old ship, the *Discovery*, was equipped for research at sea. She spent two years in the south and laid the groundwork for a more ambitious programme to be undertaken by an entirely new ship, the *Discovery II*, specially built for the purpose in 1929. This vessel, an oil-burning steamship with a very large steaming range, is still the last word in oceanographical research ships. When war broke out in 1939 she had made five trips to the Antarctic and had steamed about 50,000 miles during each trip. She covered the whole Southern Ocean with a network of observations which were carried right round the Antarctic continent. The results of her work are published in the *Discovery Reports* which have been appearing steadily since the investigations first began, and they, with the work of the Norwegian scientists working at the Academy of Science in Oslo, have given a picture of the biology of the southern Blue and Fin whales, the great whales of commerce, sufficiently complete to enable the International Whaling Conference, held yearly, to frame regulations for the effective control of the whaling industry.

Another important expedition in the years between the wars was that of the German research ship *Meteor*. She was a cruiser, a survivor of the first World War, converted to the uses of peace and equipped for deep-sea research. But her purpose and mission were not only scientific. At a time when German national pride was reviving after the humiliation of defeat her aim was partly to show the flag. This she very effectively did during her two years' cruise in the Atlantic in 1926–7. She made a great series of traverses across the ocean from west to east and from east to west, from the Arctic to the Antarctic. She took hundreds of observations on the chemistry and physics of sea water, on tides, currents and on meteorology.

In recent years the chief advances in the science of the sea have been made in what is now called "physical oceanography", the dynamics of tides and currents and the movements of water masses. In this province it may be said that German and Norwegian scientists have led the way. In 1939 there were many centres all over the world at which great progress was being made. In Europe the principal ones were the Institut für Meereskunde in Berlin and the Geophysical Institute in Bergen. In America there was the U.S. Coast and Geodetic Survey. In Britain the Marine Biological Association at Plymouth and the Department of Oceanography at the University of Liverpool have been the main centres for the study of this branch of oceanography. And if, in this brief sketch of the history of the science of the sea, the main emphasis has seemed to be on British achievement, it is not because there is any wish to detract from the work done by the scientists of other nations but because our country,

> . . . set in the silver sea,
> That serves her in the office of a moat,
> Or as a wall defensive to a house
> To guard her from the envy of less happier lands,

pointed the way throughout the 19th century when this branch of human knowledge was still in its infancy and opened up those avenues of inquiry which people in many lands have been eager to explore.

In a short article I can only outline a few of the directions which future exploration of the deep sea might take. It is clear, for example, that in the biological field the systematic collection, classification and cataloguing of marine animals and plants has gone far in advance of the study of their biology. Nevertheless there is still room for an improved technique in collecting the floating (planktonic), bottom-living (benthonic) and free-swimming (nektonic) populations of the very deep layers. We know, for instance, that there are many types of giant deep-water squids which have never yet been taken in any form of net so far devised and have been described only from their decayed remains found in the stomachs of Sperm whales which feed upon them. It is not impossible that the great deeps may yield other hitherto unknown forms.

But the main advance is likely to be in the study of the life-histories of marine animals whose biology is still imperfectly known—their spawning and feeding habits; their swarming and shoaling habits; their relations to the communities in which they live. All marine animals and plants are links in a complicated pattern of biological chains which are interdependent and, even in life-histories as intensively studied and economically important as those of the cod and the herring, there are still large gaps where our knowledge is incomplete.

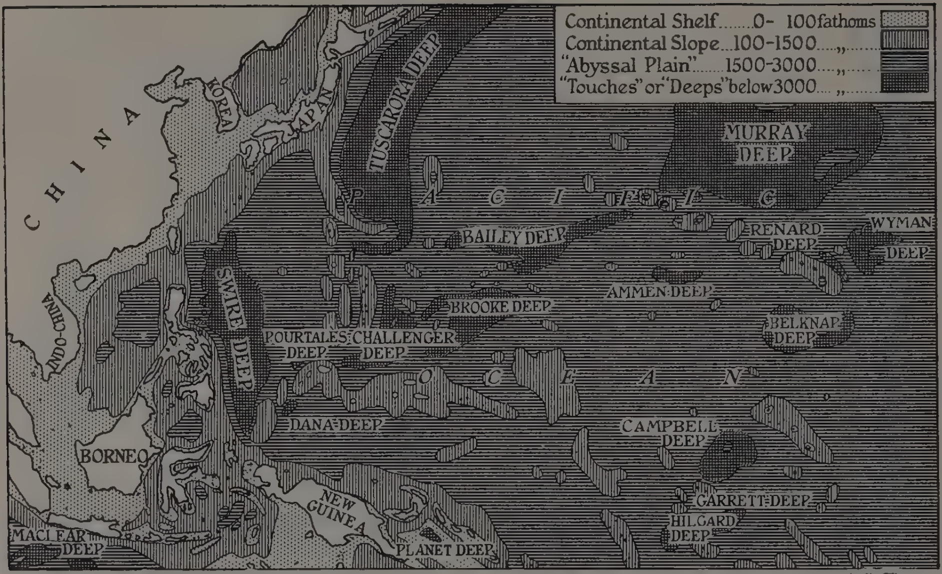
Over cycles of years, and with the seasons, great changes are known to take place in the population of the sea and in the chemical and physical properties of its water. For the investigation of these changes in many parts of the world, repeated routine observations are needed at fixed points at regular intervals by specially equipped research vessels.

At a meeting of the Linnean Society of London held in March 1946 distinguished oceanographers discussed the lines which future research might take. Dr G. E. R. Deacon called for a systematic examination of the North Atlantic Ocean on the broad lines of similar investigations carried out by the Discovery Committee's ships in the Southern Ocean. He emphasized the need for lines of observations across the boundaries between the various water masses, tropical, subtropical and polar, to assess the strength of each influence and its variations, for these have profound effects upon the fluctuations of the fisheries—often of those in distant parts of the ocean.

Mr F. S. Russell, Director of the Plymouth Marine Biological Station, after stressing the need for more research on the biology of marine animals, invited the attention of physiologists to the almost virgin field that awaits them in the sea. "All oceanographical expeditions in the past", he said, "have brought back the bulk of their collections dead and pickled in bottles. I should like to suggest that the next step is to build or modify a ship so that it will be a great sea-going aquarium. Early in the war, I believe, the late Dr Kemp and others had in mind the possibility of an expedition nearer home than

The new whaling factory ship Balaena *(15,000 tons) photographed before departing for the Antarctic, when her flensing deck, where whales are dismembered, was filled with stores. For reconnaissance she carried two Walrus aircraft, one of which is seen here being swung aboard by cranes*

Centra



Based on a Bathymetrical Chart of the Oceans according to Sir John Murray, from "Depths of the Ocean" (Macmillan) *A. J. Thornton*

usual, namely over the deep water and the continental slope west of Ireland. This idea has much to commend it. . . . There are many interesting problems waiting on our doorstep. A quantitative study of the deep ocean floor and of the continental slope still waits to be done. The area is also of interest in relation to the distribution of plankton indicators"—animals which, by their presence, indicate the origin and type of water in which they are found—"and their bearing on the water movements in the English Channel and the Irish Sea."

Dr Blegvad, Director of the Danish Biological Station and General Secretary of the International Council for the Exploration of the Sea, pointed out how little is known about the causes of the vast mortality of marine animals. The cod sheds into the sea four million eggs at a single spawning, but only a few survive. We do not know what are the factors which cause the millions of germ-cells to perish. We know only that the critical period falls during the stage when the fish is a fry; for a good spawning year, when immense numbers of eggs are shed, does not necessarily result in an abundance of fish hatched in that year.

Of the physical field I am less competent to speak. The increased use of the echo-sounding technique will gradually reveal in even greater detail the contours of the ocean floor. Already it is becoming clear that the "abyssal plain", the region of deep water beyond the continental slope, is much more rugged and broken in outline than was at one time supposed. And along the continental slope, where the sea floor inclines steeply to the abyss beyond the 100 fathom line, echo-sounding is bringing to light the existence of submarine canyons, many of them of vast size, continuing the courses of the major rivers seaward over the continental shelf, the area of shallow water within the 100 fathom line where the sea floor has a much gentler inclination. It has shown too the presence of innumerable lesser gullies, with intervening ridges, on the slope itself, for which there is at present no entirely satisfactory explanation.

Much, then, remains to be discovered about the actual shape of the earth below the ocean that covers three-quarters of its surface. But what of the earth's crust, the floor of the ocean underlying the pelagic oozes? We still do not know exactly what sort of rock forms this crust. Its character can only be inferred at present from seismographic records and from the nature of oceanic islands. Deep borings, therefore, seem to be required, and these would also reveal the order in which the pelagic oozes have been laid down and give some clue to the changes which have taken place in past ages in the direction and character of water masses. Such information might help us to learn more about the past, and so to guess something about the future, of the earth under the waters, as a final stage in the exploration of the deep sea.

The Diffusion of Greek Culture

X. The Renaissance

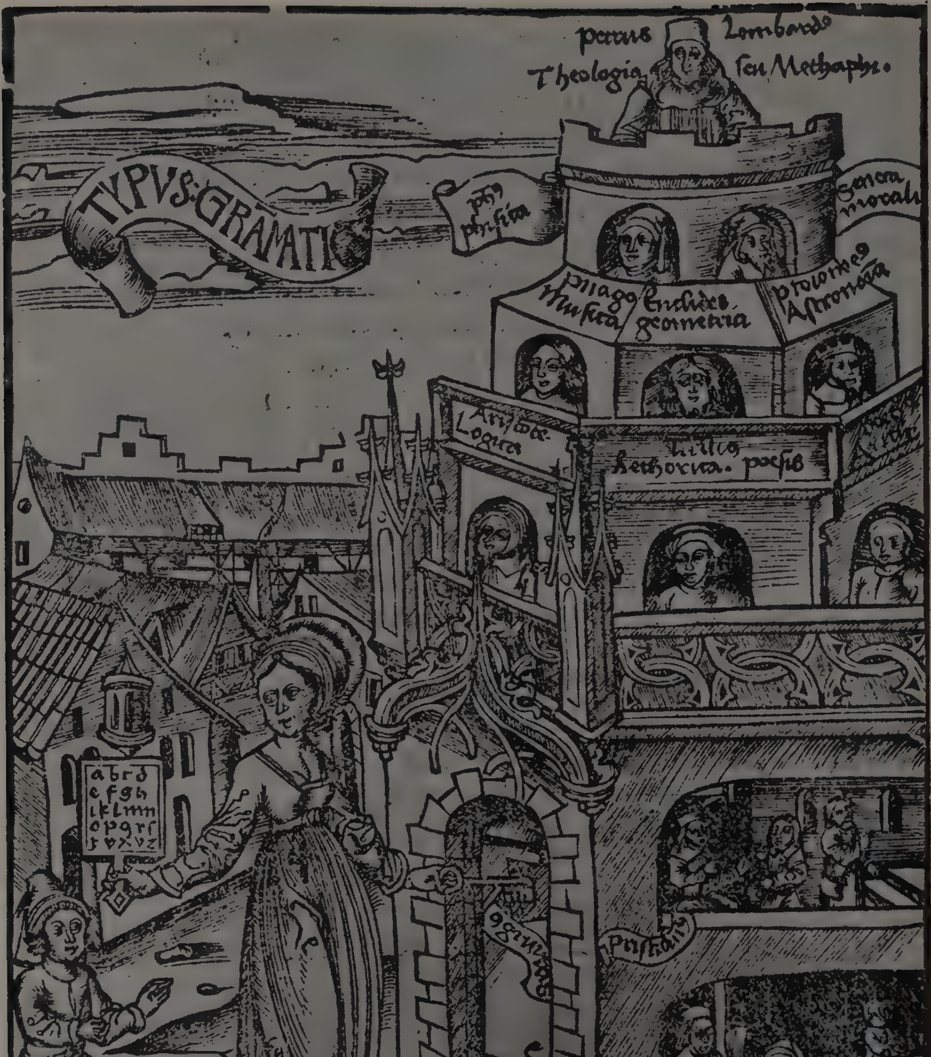
by R. W. MOORE

With the present article the Head Master of Harrow, who began this series, brings it to an end. It will have served a useful purpose if it has thrown any light on one of the chief problems of our time, by surveying in their broad geographical relationship the civilizations that have come under the direct influence of Greek culture, and indicating, in the case of Western and Eastern Europe, not only the points from which they have diverged, but also their common origin. In the consideration of these resides a hope of mutual understanding and eventual synthesis. Readers have expressed the wish that the series may be republished in book form. This we hope to do later

THE influence of the ancient Greek culture on the civilization of Western Europe reached its consummation at the Renaissance, the cultural awakening of the 14th and 15th centuries which marks for historians the beginning of the modern world. Not the least interesting aspect of this awakening is that it was a gradual process, the beginnings of which it is hardly possible to pin down in time. It is a vice of dogmatism to simplify great issues for the purposes of clear-cut demonstration, and popular knowledge in the historical field no less than in others likes neat patterns for its digestion. Hence the straight lines drawn across history at many dates: at 404 B.C. (the end of the Peloponnesian War), at 323 B.C. (the death of Alexander), at 44 B.C. (the assassination of Julius Caesar), at A.D. 180 (the death of Marcus Aurelius), at A.D. 410 (the capture of Rome by the Goths), and in the history of our own country at A.D. 1066. There is much virtue in these dates and much danger. The deeper the student penetrates into the past the less he will be inclined to see ends and the more he will tend to see goings-on. So it is with the story of the Renaissance.

For lack of space, and because the artists have received more public attention than the scholars, I do not propose in the present essay to try to unravel the complications of Greek influence on the aesthetic life of Western Europe in the Renaissance; it will be a sufficient task to tell in brief how Greek ideas came to revivify its intellectual life. There are many significant events in this story but no uniquely isolable dates. At one time it was thought that a significant line could be drawn at A.D. 1453, when Constantinople fell to the Ottoman Turks and the Eastern Empire of Rome came at last to an end and Greek scholars came hurrying West with their precious learning. It is true that the line has significance in the history of the Near East and that the Byzantine refugees contributed powerfully to the Greek studies of the West, but, as far as the Renaissance was concerned, we know now that they came to a world which had long since woken up in itself and had possibly never really been asleep.

Through the Dark Ages and into the Middle Ages the schools of the Church kept alive in the West, however imperfectly, some measure of Greek culture in which Plato and Aristotle were represented; Plato by a Latin translation of part of the *Timaeus* and miscellaneous references in various Latin authors; Aristotle by two of his works on logic (in the translation of Boethius). The other logical works of Aristotle and the *Physics* and *Metaphysics* were recovered towards the end of the 12th century. The overriding scholastic interests of the Middle Ages were theology and logic; but the great development which led to the Renaissance lay in the direction of science. There was no theoretic lack of interest in science in the Universities of the Middle Ages; it was the ignorance of Greek science which held them back. Until Greek science was recovered, science remained an affair of formulas and catechisms. As early as the 12th century a few bright spirits such as John of Salisbury (1110–80) and Roger Bacon (*c.* 1214–94) knew that there was a science to be recovered and that the key to its recovery lay in the knowledge of Greek. John of Salisbury, the most learned man of



From G. Reisch, "*Margarita Philosophica*"

This quaint picture, published in 1503, illustrates the limitations and the order of mediaeval education. The child is given his ABC and therewith the key to the House of Learning. In it he will study Latin grammar on the ground-floor (Donatus), syntax (Priscian) on the first: logic, rhetoric, arithmetic, music, geometry, astronomy in turn above until in theology the pinnacle is reached his day and a cosmopolitan whose diplomatic and ecclesiastical missions took him many times to France and Italy, tried to learn Greek from "a learned Greek" at Beneventum, apparently with little success. Roger Bacon evidently attained to a considerable knowledge of the language, as his *Greek Grammar*, now in the Library of Corpus Christi College, Oxford, testifies.

Greek was not to be recovered for the West as a direct instrument of culture until two centuries later, when the Humanists built the necessary bridge between mediaeval and Greek thought in the recovery of classical Latin, the natural intermediary; but a beginning had been made. As early as the 10th century Greek astronomy, mathematics, medicine were being mediated from the East to the West. Venice was trading with the East in the 9th century, and the Latin occupation of Constantinople afforded scope of which enterprising Western scholars could avail themselves. In spite of the dependence on the science gradually filtered through two or more Semitic languages, of which Dr Sherwood Taylor has written, the urge for direct access to the Greek language and the originals was strong. Roger Bacon was vehement on the point; teachers of Greek, he maintained, could still be found in the West and could be brought from Italy and the East as had been done by Robert Grosseteste, Bishop of Lincoln (*c.* 1175–1253). In 1300 the University of Paris petitioned the Pope for a College to teach Greek and Arabic; in 1311 the Council of Vienne instructed the Universities of Paris, Oxford, Bologna and Salamanca to teach Hebrew, Arabic and Greek and to obtain translations from these languages into Latin. Petrarch possessed a manuscript of part of the Iliad of Homer and sadly regretted that he could not read it. It was the rapprochement involved in the abortive attempt to unite the Eastern and Western Church in the early 15th century (the Councils of Ferrara and Florence) which effectively started the revival of Greek studies in the West. But in the previous century there had been a continuous stream of scholars from Western Europe to Italy in quest of Greek, and the merchant princes of Italy had begun in patronage the services to Humanism which reached magnificent proportions in the full Renaissance. For the trade channels were opening up, and culture was gradually emancipating itself from dependence on Islam. Through the growing contact with Eastern Europe the mass of knowledge was growing in the West and straining and breaking through the hard shell in which the mediaeval discipline had encased the human spirit.

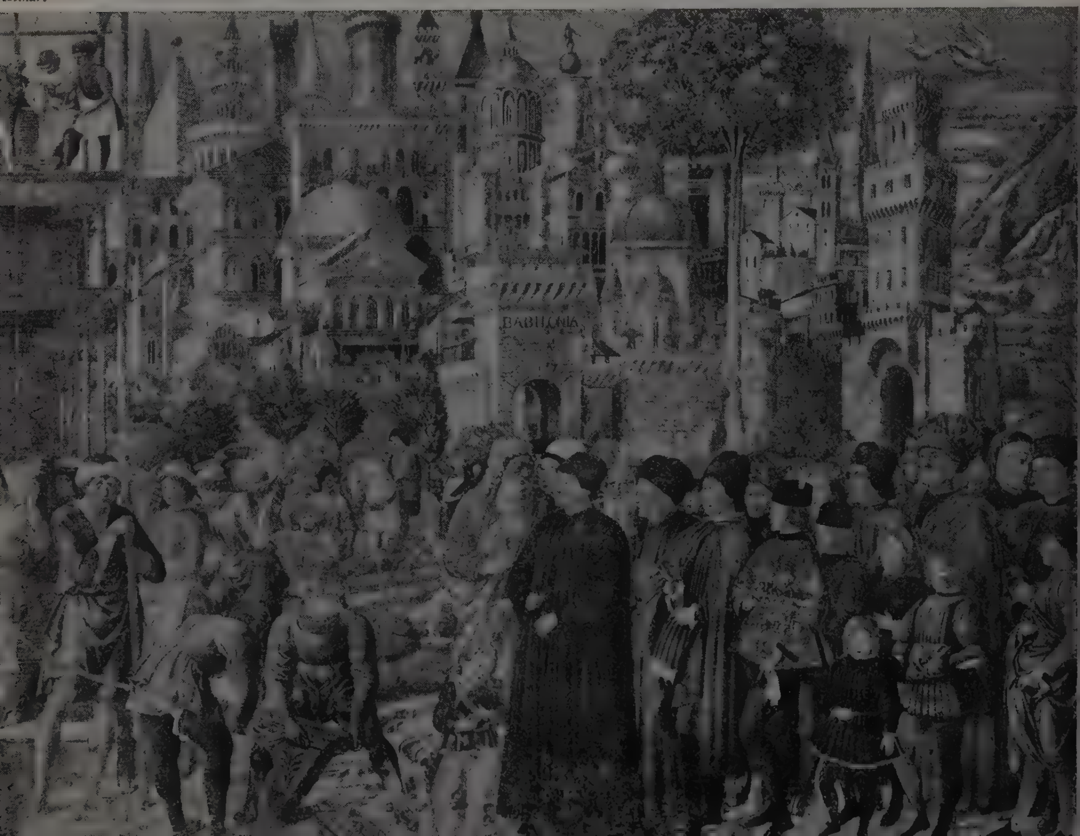
That discipline, indeed, extended to the whole field of human activity and was in part, curiously enough, enforced by a group of men who made an indispensable contribution to the revolt against it. For scholars and artists do not work *in vacuo*: they have to be furnished with economic foundations. Up to the later Middle Ages the Western world had had, since Roman times, little real urban life and outside the monasteries there were very few places where scholars and artists could work. The only urban agglomerations were ecclesiastical "cities" and military "bourgs". Then in two chief regions—Northern Italy and the Low Countries—there began to arise a new set of men possessing mobile wealth, largely derived from the cloth trade. These cloth-weavers, merchants and artisans were the parents of the *bourgeoisie* and the creators of true urban life and administration as the West has known it ever since. It was a life dominated by the capitalist spirit and directed by merchant-venturers who as early as the 13th century had become oligarchic, plutocratic rulers of the Lombard and Flemish towns. These towns, however, and others established throughout Western Europe after their pattern, came to exist merely for their own burgesses, who by means of monopoly and privilege subjected economic activity to rigid regulation. The traffic in money was in the hands of a few Italian bankers and men of affairs; elsewhere the activities of capital were restricted to local markets.

Early in the 15th century a new class of capitalists began to make its appearance in Flanders, France and England and in some cities of Southern Germany. To quote Pirenne: "The liberty that the new men demanded" (and eventually obtained) "was that which would enfranchise them from the urban regulation of the monopolies enjoyed by the trade corporations, the restrictions imposed upon sale and purchase, the control of the markets, the fixing of wages by the law, the official apprenticeship, and the privileges which, in every city, reserved commerce for the burgesses and reduced the stranger to the status of a pariah. What they claimed was the common right to engage in industry and commerce, which must be rescued from municipal exclusivism, and disencumbered of those privileges which were doubtless indispensable when industry and commerce were in their infancy, but which were now preventing their development."

Such men, and the nobility into whose ranks their wealth and intelligence enabled them to penetrate, were the patrons who furnished the economic foundations for the life of scholars and artists in the Renaissance; it was their money that kept the new printing presses busy; their sons who thronged the universities; their houses and the churches to which they made donations that were decorated with paintings by the Renaissance artists. Without the fertile soil which they provided, the seed derived from ancient Greece and Rome might never have fructified in Western Europe; for if the mere dissemination of Greek ideas had been enough to set the Renaissance going, it might have begun (as previous contributors to this series have shown) some centuries earlier.

It is to Italy that we must turn to see most clearly the stages of the unfolding of the Renaissance. The story, which can be told only in the briefest way, stretches over two centuries. In it we see Italy once more in its intermediate position in the Mediterranean serving, as it had served in the great age of the Roman Empire, as a focal point of European culture, uniting in some sort East and West and radiating West and North the untiring forces of Hellenism. It begins with Petrarch (1304–74), who for all his inability to read his manuscripts of Plato and Homer, had some modicum of Greek which he had acquired from a Greek monk. It was at his instance that Boccaccio set himself to learn Greek and brought into Florence the first teacher of Greek (1360–1363).

Some thirty years later Manuel Chrysoloras (*c.* 1350–1415), who had come to Italy from Constantinople in the first instance on a diplomatic mission, was teaching Greek in Florence and numbered among his pupils a group of famous humanists, among them Guarino and Poggio, who were to do outstanding service to Western learning in the recovery of ancient manuscripts.



In 1469 Benozzo Gozzoli painted a series of frescoes in the Campo Santo at Pisa. Into one of them, "The Tower of Babel", he introduced not only contemporary Florentine buildings but also classical edifices, which together reflected the prevailing passion for everything Graeco-Roman. In the foreground he placed a group of richly dressed Italian citizens, typifying the spirit of the New Age

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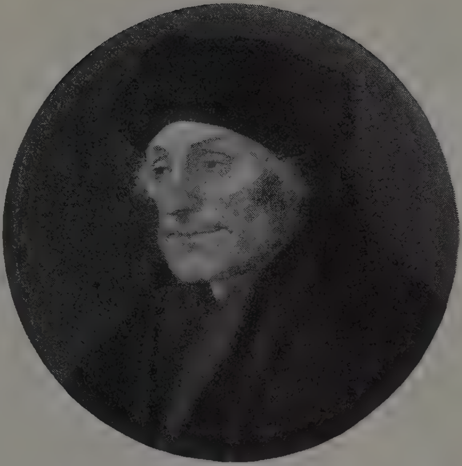
Chrysoloras died at the Council of Constance. His work was carried on by Gemistos Plethon (*c.* 1356–1450), who at a great age was selected one of the six champions of the Greek Church at the Council of Florence (1439). Any effort he made towards ecclesiastical reunion at that unavailing Council was eclipsed by the startling success of his lectures on Plato in that city, as a result of which Cosimo de' Medici founded the Platonic Academy which, by the agency of Ficino and the celebrated Pico della Mirandola, left a lasting impression on the culture of Italy and, through Reuchlin and Melanchthon, on that of Germany.

Another of the Greeks at the Council of Florence was Bessarion (1403–72), who joined the Church of Rome and became Cardinal and very nearly Pope and left behind him translations of the *Memorabilia* of Xenophon and of Aristotle's *Metaphysics* and a great collection of Greek manuscripts which became the nucleus of the famous library of St Mark's, Venice. After Bessarion the greatest of the Byzantine immigrants (he fled from his home at Thessalonica in 1430 when it was taken by the Turks) was Theodorus Gaza. He became instructor in Greek at the famous school of Vittorino da Feltre at Mantua, where he also learnt Latin, became the first Professor of Greek at Ferrara (1444), and in 1451 went to Rome to assist in the great plan of Nicholas V of translating into Latin all the principal Greek classics. Among his works were versions of scientific books of Aristotle and the botanist Theophrastus. He also produced a Greek Grammar and Syntax which was used by Erasmus in his teaching at Cambridge.

While these scholars of the East were disseminating Greek and learning Latin in the West, Italian scholars were travelling East to seek their Greek nearer to the source. Guarino stayed for five years in the house of Chrysoloras in Constantinople (1403–8); Aurispa the great collector acquired his Greek in the same city and returned to Venice in 1423, we are told, with no less than 238 manuscripts.

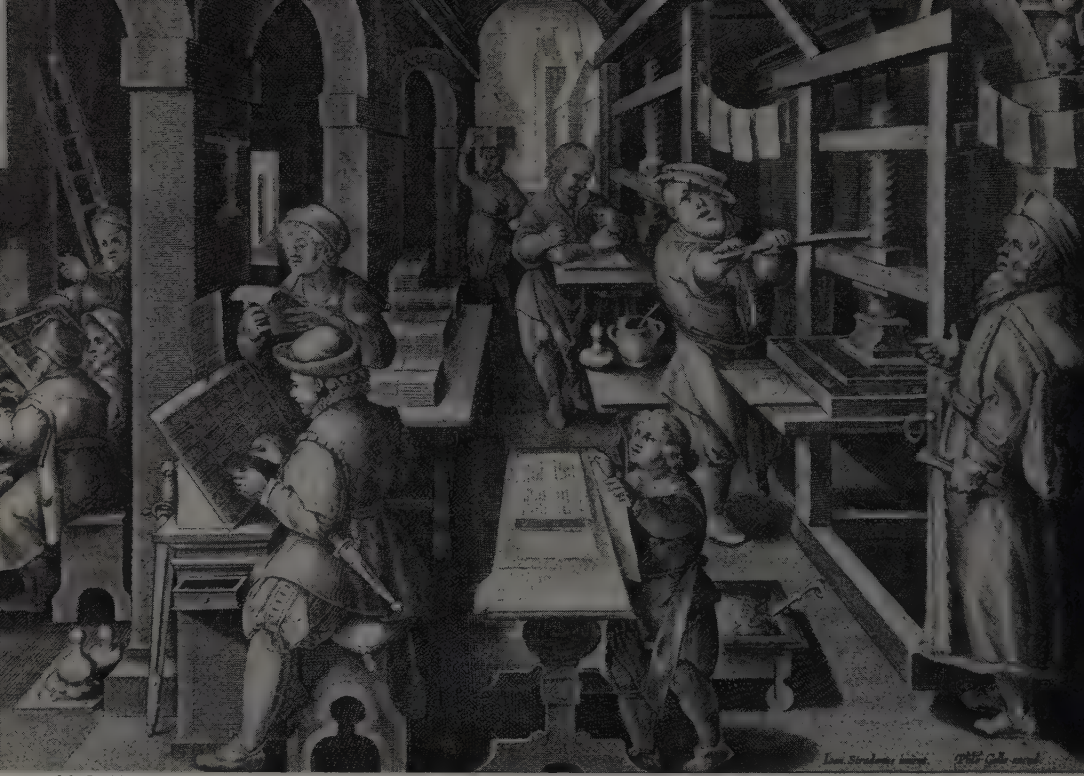
The ferment spread to the lands of the West and North. One of the greatest of Renaissance scholars, Erasmus (1466–1536), was a Dutchman; but his activities were cosmopolitan. He taught in Paris and pursued his work in England, Italy and Germany. He was for a time closely associated with the pioneer printer Aldus Manutius at Venice, spent some years at Cambridge as Lady Margaret Professor of Divinity and Lecturer in Greek, and much of his later life at Basel. He left behind him the first complete edition of Aristotle, a book on the pronunciation of Greek and Latin, the first edition of the astronomer and mathematician Ptolemy and, more significant still, his Greek Testament. His life-work thus holds together and symbolizes the two main motifs in the evolution of Renaissance learning in this country and Northern Europe: the desire for a better science and the desire for an open Bible reinforced by the phenomenon of the Reformation.



Erasmus the Dutchman (c. *1466–1536*)*: cosmopolitan teacher, humanist, theologian: pioneer of modern biblical scholarship, of "the open Bible", and of the study of Greek in English universities. From a portrait by Hans Holbein the Younger*

The pioneers of the rebirth of Greek scholarship in England were Selling, Prior of Canterbury (*d.* 1494), and Thomas Linacre (*c.* 1460–1524), Physician to Henry VIII and founder of the College of Physicians, both of whom studied Greek at Florence. And it was to Italy through the enthusiasm of Linacre's friends, William Grocyn (Fellow of New College) and William Latimer (Fellow of All Souls), and William Lily (the first High Master of Saint Paul's) that Oxford owed the beginning of her Greek. When Erasmus came to Oxford (1498–1500) he found in these three kindred souls, as he also found in Dean Colet and Sir Thomas More. In Cambridge (1510–13) Erasmus was a pioneer, and after he left the study of Greek was fostered by a group which included the celebrated Roger Ascham.

Germany too had a handsome share in the revival of Greek studies and can show an



courtesy of the British Museum

(Above) *A Florentine Printing Office* c. *1570, after a drawing by Giovanni Stradano. The processes of composing, inking, printing and proof-reading are clearly indicated.* (Opposite) *A page of Erasmus's Bible, printed at Basel in 1516, open at* Acts *XVII: St Paul on Mars' hill at Athens, arguing with typically Greek dialectical acumen and, incidentally, quoting* (*v. 28*) *from a Greek poet*

impressive list of humanists of this age. Johann Müller of Königsberg ("Regiomontanus") (1436–76), who became Archbishop of Ratisbon, had worked with Bessarion in Italy and made Latin translations of the works of Ptolemy and of the *Conic Sections* of Apollonius of Perga. Peter Luder (*c.* 1415–*c.* 1474) had been a pupil of Guarino at Ferrara and had studied medicine at Padua before he became a lecturer at Heidelberg, Leipzig and Basel. Greater names still are those of Rudolph Agricola (1444–85), who spent seven years in Italy where he studied under Theodorus Gaza before settling down as a teacher at Heidelberg, and Johann Reuchlin (1455–1522), who studied in Paris and Basel and taught at Basel, Orleans and Poitiers, another exemplar of the liberal frontiers which the Greek-inspired culture enjoyed in this invigorating age. It was not only through the efforts of the geographical explorers that the world was becoming larger.

But these efforts were intimately connected with the enlargement of intellectual frontiers. I have mentioned the importance of the new capitalists who appeared in 15th-century Western Europe. Even if royal promoters of exploration like Henry the Navigator may have had no economic motive, it was the merchant-venturers of that period who most directly benefited by the geographical discoveries of the 15th century; and the enormous access of material wealth to which those discoveries gave rise, especially on the Atlantic seaboard, hastened immeasurably the growth of a secular society which sought its intellectual food in the learning of the Ancients rather than in that of the Church, hitherto supreme in the domain of thought.

It is not commonly appreciated that it was Greek science and mathematics which formed the dominant influence of the Greek legacy on the development of the modern Western world. For it has been overshadowed by

ξενίζοντα γάρ τινα εἰσφέρεις εἰς τὰς ἀκοὰς ἡμῶν. βουλόμεθα οὖν γνῶναι, τί ἂν θέλοι ταῦτα εἶναι. Ἀθηναῖοι δὲ πάντες καὶ οἱ ἐπιδημοῦντες ξένοι, εἰς οὐδὲν ἕτερον εὐκαίρουν, ἢ λέγειν τι καὶ ἀκούειν καινότερον. Σταθεὶς δὲ ὁ παῦλος ἐν μέσῳ τοῦ ἀρείου πάγου, ἔφη. Ἄνδρες Ἀθηναῖοι, κατὰ πάντα ὡς δεισιδαιμονεστέρους ὑμᾶς θεωρῶ. διερχόμενος γὰρ καὶ ἀναθεωρῶν τὰ σεβάσματα ὑμῶν, εὗρον καὶ βωμὸν ἐν ᾧ ἐπεγέγραπτο. ἀγνώστῳ θεῷ. ὃν οὖν ἀγνοοῦντες εὐσεβεῖτε, τοῦτον ἐγὼ καταγγέλλω ὑμῖν. ὁ θεὸς ὁ ποιήσας τὸν κόσμον καὶ πάντα τὰ ἐν αὐτῷ, οὗτος οὐρανοῦ καὶ γῆς ὁ κύριος ὑπάρχων, οὐκ ἐν χειροποιήτοις ναοῖς κατοικεῖ, οὐδὲ ὑπὸ χειρῶν ἀνθρώπων θεραπεύεται, προσδεόμενος τινὸς, αὐτὸς διδοὺς πᾶσι ζωὴν καὶ πνοὴν κατὰ πάντα. ἐποίησέ τε ἐξ ἑνὸς αἵματος πᾶν ἔθνος ἀνθρώπων κατοικεῖν ἐπὶ πᾶν τὸ πρόσωπον τῆς γῆς, ὁρίσας προστεταγμένους καιροὺς, καὶ τὰς ὁροθεσίας τῆς κατοικίας αὐτῶν ζητεῖν τὸν κύριον, εἰ ἄραγε ψηλαφήσειεν αὐτὸν καὶ εὕροιεν, καίγε οὐ μακρὰν ἀπὸ ἑνὸς ἑκάστου ἡμῶν ὑπάρχοντα. ἐν αὐτῷ γὰρ ζῶμεν καὶ κινούμεθα καὶ ἐσμέν, ὡς καί τινες τῶν καθ' ὑμᾶς ποιητῶν εἰρήκασι. τοῦ γὰρ καὶ γένος ἐσμέν. Γένος οὖν ὑπάρχοντες τοῦ θεοῦ, οὐκ ὀφείλομεν νομίζειν χρυσῷ, ἢ ἀργύρῳ, ἢ λίθῳ, χαράγματι τέχνης καὶ ἐνθυμήσεως ἀνθρώπου, τὸ θεῖον εἶναι ὅμοιον. τοὺς μὲν οὖν χρόνους τῆς ἀγνοίας ὑπεριδὼν ὁ θεὸς, τὰ νῦν παραγγέλλει τοῖς ἀνθρώποις πᾶσι πανταχοῦ μετανοεῖν, διότι ἔστησεν ἡμέραν, ἐν ᾗ μέλλει κρίνειν τὴν οἰκουμένην ἐν δικαιοσύνῃ, ἐν ἀνδρὶ ᾧ ὥρισε, πίστιν παρασχὼν πᾶσιν, ἀναστήσας αὐτὸν ἐκ νεκρῶν. ἀκούσαντες δὲ ἀνάστασιν νεκρῶν, οἱ μὲν ἐχλεύαζον, οἱ δὲ εἶπον, ἀκουσό-

Noua enim q̃dã infers aurib⁹ noſtris. Volumus ergo ſcire quid nã uelint hæc eſſe. Athenienſes aũt omnes & qui illic uerſabant̃ hoſpites ad nihil aliud uacabãt, niſi aut dicẽdũ aut audiẽdũ aliq̃d noui. Stans aũt Paulus in medio Martij uici ait. Viri Athenienſes, per omnia fere ſuperſtitioſiores uos uideo. Præteriens enim & uidens ſimulacra ueſtra, inueni & arã i qua inſcriptũ erat. Ignoto deo. Quẽ ergo ignorãtes colitis, hũc ego annũcio uobis. Deus qui fecit mũdum & omnia quæ in eo ſunt, hic cœli & terræ cũ ſit dñs, nõ in manufactis tẽplis habitat, nec manibus humanis colitur indigens aliquo, cum ipſe det omnibus uitam & halitum per omnia, fecitq; ex uno ſanguine omne genus hominum, ut inhabitaret ſup̱ uniuerſam faciẽ terræ, definitis p̃ſtitutis tp̃ibus & p̃fixis terminis habitationis eorum, ut q̃rerent deũ, ſi forte palpentur eum aut inueniant, q̃uis non longe ſit ab uno quoq; noſtrũ. In ipſo enim uiuimus & mouemur & ſum⁹, ſicut & q̃dã ueſtratiũ poetaꝝ dixerũt. Huius em̃ & genus ſum⁹. Genus ergo cũ ſim⁹ dei, nõ debemus exiſtimare auro aut argẽto aut lapidi arte ſculpto & iuẽto hoĩs numẽ eẽ ſimile. Et tp̃a quidẽ huius ignorãtiæ cũ diſſimulaſſet deus, nũc annũciat hoĩb⁹, ut oẽs ubiq; reſipiſcãt, eo q̃ ſtatuit diẽ in quo iudicatur⁹ eſt orbẽ terraꝝ in iuſticia, in eo uiro in quo ſtatuerat, fide p̃ſtita oibus, excitato illo a mortuis. Cũ audiſſent aũt reſurrectionẽ mortuoꝝ, alij quidẽ irridebant, alij uero dixerũt.

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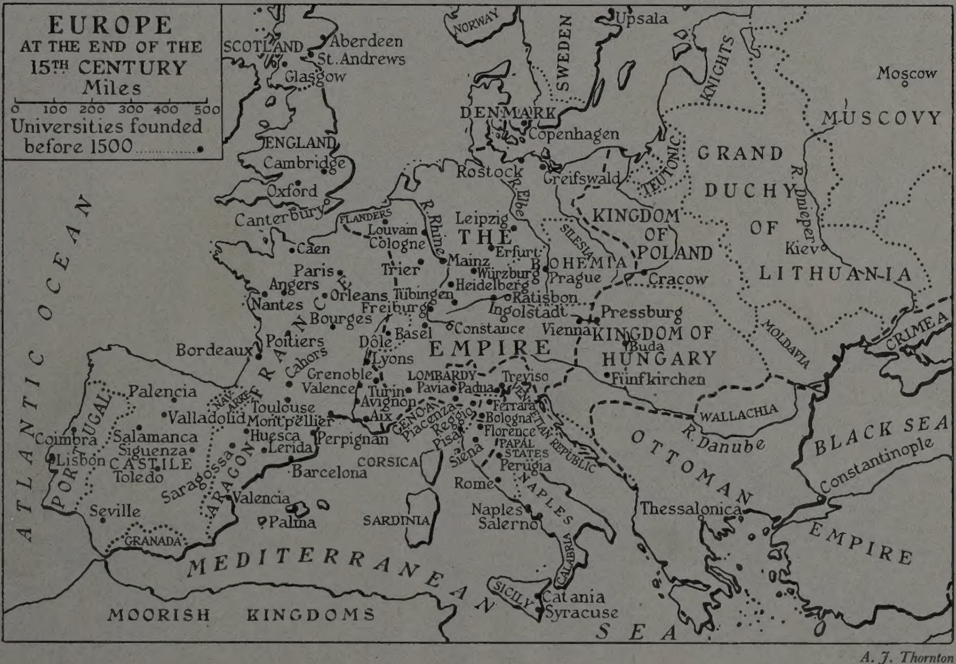
(Above) *Carpaccio's "St Jerome" depicts the study of a Venetian scholar in the early years of the 16th century.* (Below) *A small water-colour by Laurentius Voltalina showing a University lecture about 1420. The scene is Bologna: a German professor, Henricus de Alemannia, is lecturing on Ethics with conspicuous intensity to an audience whose variety of reaction, delightfully realistic, could be found in its modern counterpart*

m Burckhardt's "Civilization of the Renaissance" (Phaidon Press)

the aesthetic elements, the literature, architecture and art which have a more concrete appeal and are better understanded of the generality of men. Science and mathematics have a more specialized appeal and require a certain background of scholarly equipment, and an objective vision and world-outlook before they can take root and flourish in a society. The academic society of the Middle Ages had ostensibly held science and mathematics in high repute. The major studies of the Faculties of Art in mediaeval universities were arithmetic, geometry, music (harmonics) and astronomy; such was the *quadrivium*, and the subjects of the *trivium*, grammar, rhetoric and dialectic, were, as the name suggests, regarded as comparatively trivial. But the preoccupation with theology and systematizing, the desire to have knowledge explicitly related at all levels to a hierarchy of values and therefore cut, dried and formularized for dogmatic purposes, produced an atmosphere which was against direct observation of nature and the experimentation which is the life and breath of science.

Thus even when some of the better Greek biological treatises were made accessible direct from the Greek during the 13th century the new knowledge did not fall on really fertile ground, for all the longing for a better science. Other than academic stimuli were needed before the leaven of Greek ideas could do its work: the rise of the Italian city-states, the emancipation from narrowly dogmatic religion, the new eyes for nature and the human form as manifested among the Italian painters of the 15th century; the growth in Western Europe of a society, anxious to break its mediaeval fetters, to which the ideas transmitted by the Italian Humanists made an immediate appeal. And even when Greek books became widely available and the Humanists got to work the primary interest in general was in literary merit and not in mathematical and scientific ideas. Nor had the Arab carriers in themselves set a good example; for Arabic science confronted with Greek treatises took the form rather of comment and paraphrase than of development on the new data afforded. When we hear of Western scholars making scientific experiments for themselves, such as Robert Grosseteste and his pupil Roger Bacon, who experimented with mirrors and lenses in pursuit of the theory of light, and Nicholas of Cusa (born 1401), who experimented with growing plants and wrote a treatise on the use of the balance in physical experimentation, we know that they are exceptions which point to a rule.

But, however adverse the atmosphere of academic thought, there was one department



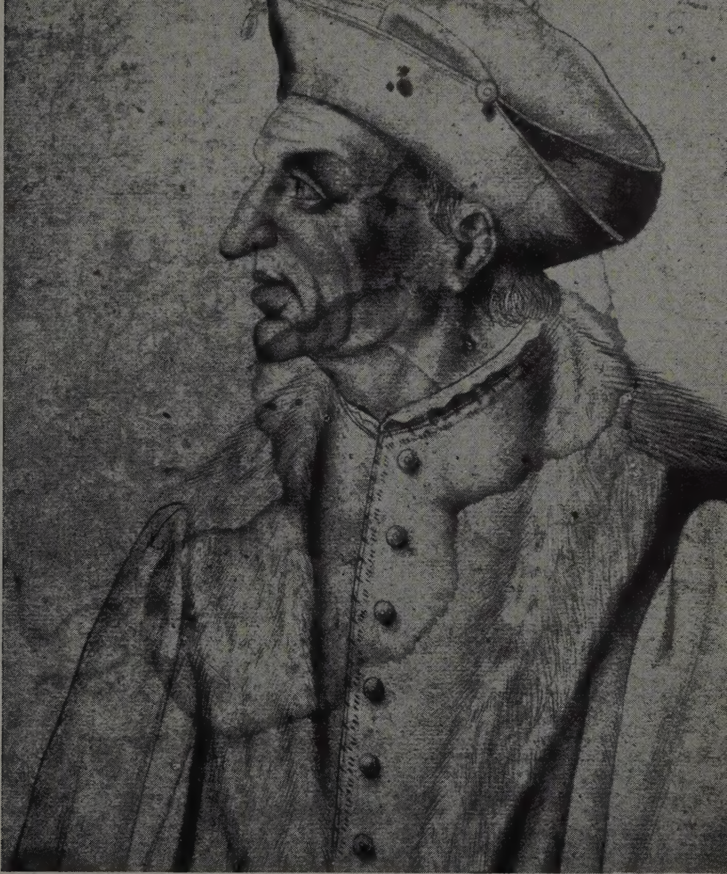
A. J. Thornton

of knowledge which could not be denied. Whatever the preoccupation with God and the human soul, men's bodies grew sick and men looked for remedies. Hence the persistence of interest in Greek medical theory throughout the Middle Ages. It took no very exalted form, for it was concerned not with general principles but with specifics, was not academically respectable and subsisted almost entirely on garbled knowledge of the work of Galen. Thus the mass of Greek medical learning current in these times was largely dross, being mainly lists of drugs, antidotes and symptoms, for the most part spurious off-shoots of the great Hippocratic medical corpus. Of the better elements of Greek medicine the Middle Ages knew little or nothing; and when they did come through they were not appreciated before the full current of the Renaissance had set in. Thus the work of such pioneers as the African monk Constantine (1017–87), who had lived for some years at Salerno (which from its foundation had a strong medical bias) and spent much of his life translating medical works from Arabic into Latin, and Gerard of Cremona (1114–87), who by reason of a long stay at Toledo was able to perform a similar service more effectively, remained virtually without result.

More encouraging was the revival of the 13th century, when despite the predominant reliance on Arabic sources certain works were translated direct from the Greek, notably Aristotle's scientific works, and a big stride forward was taken when Galen's great book *On the Uses of the Parts of the Body* was translated from the Greek into Latin by Nicholas of Reggio in the first half of the 14th century. This book, with all its mistakes, afforded the best theoretical system of the human body then to be had and, coinciding as it did in time with the revival of dissection in the medical schools, exercised an enduring influence on the development of surgery. It may be regarded, says Dr Charles Singer, as "the starting-point of modern scientific medicine". Linacre, by his translations, further contri-

The Doctor's House: 15th century. Garbled Latin versions of classical authors were the chief source of medical knowledge in the Middle Ages; and it was not until the works of Galen, written in the 2nd century A.D., were translated afresh from Greek that medical science began to advance

courtesy of the British Museum



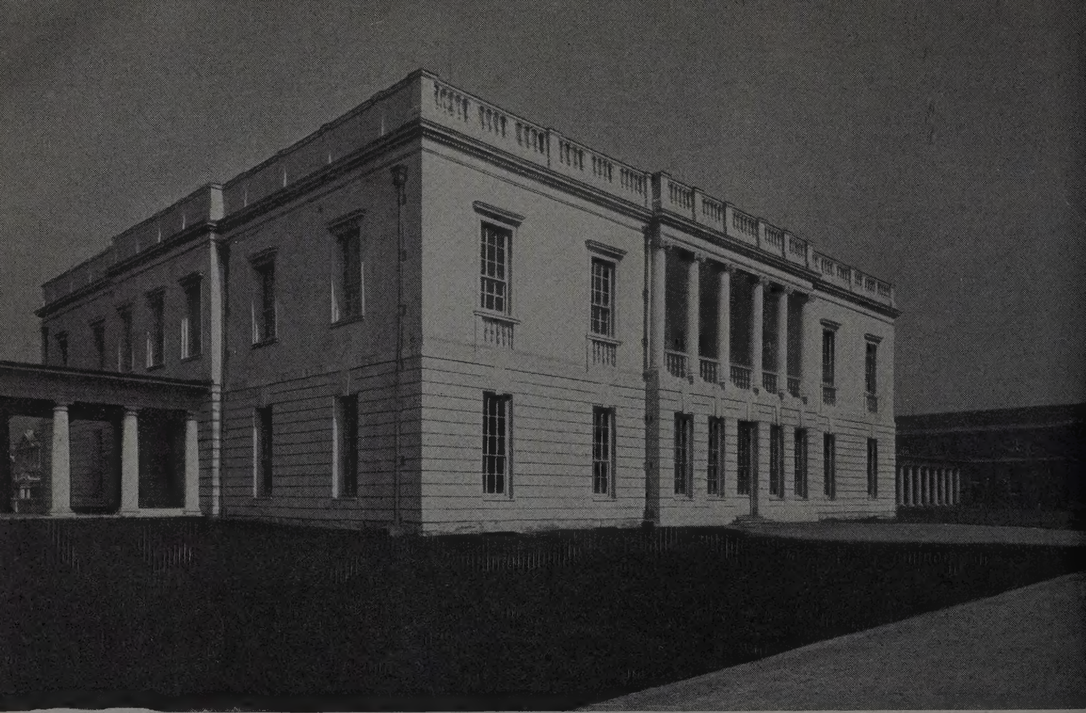
Thomas Linacre (c. *1460–1524*), *Physician to Henry VIII, founder and first president of the College of Physicians: translator of Galen: one of the ablest and earliest of the English humanists, who helped to pass on the Greek medical learning to stimulate and to further modern medical progress*

By courtesy of the British Muse

buted to the work of transmitting Galen to the West. The anatomical work of Leonardo da Vinci and Vesalius (1514–64) was based on Galen. And Linacre's version of Galen's *De temperamentis et de inaequali intemperie*, printed at Cambridge in 1521, is said to have been the first book printed in this country for which Greek type was used. Eleven years later the first Greek text of the Aphorisms of Hippocrates was produced, edited by none other than François Rabelais.

The obligation of medical advance in the 16th and 17th centuries to knowledge of the Greek classics scarcely admits of overemphasis. But for Galen the anatomical work of Vesalius would not have been done; modern clinical practice through its pioneer Thomas Sydenham derives essentially from the clinical work of the school of Hippocrates; William Harvey, who is credited with the discovery of the circulation of the blood, revived a physiological truth which was a commonplace in ancient medicine; and his further advances were based on the start given him by Herophilus and other Greek authorities.

The same story of progress prompted by the rediscovery of Greek theories and extended from where the Greeks left off is revealed in the field of astronomy. We have the testimony of the great revolutionary Copernicus himself that he was first impelled to the idea of a heliocentric universe by reading in a Greek source that the school of Pythagoras had held this view. Had he but known it, Aristarchus of Samos (*c.* 310–230 B.C.) had worked out the same hypothesis on a mathematical basis. The work of Galileo and Kepler had a similar foundation; Galileo was a student of Plato, and Kepler for his work on the planetary orbits depended on the elaborate conic sections of the Greek mathematicians. Isaac Newton was similarly indebted to the virtuosity of Greek mathematics, and it is an eloquent symptom of the connection between Greek and modern mathematics that his teacher Isaac Barrow at Cambridge passed from the professorship



yright "Country Life"

Palladio embodied the results of his extensive researches into Graeco-Roman architecture in a work published at Venice in 1570. A copy of this work exists with annotations by his disciple Inigo Jones. The Queen's House at Greenwich, built in 1635, is perhaps the purest example of the classical style as Inigo Jones initiated it in England: harmonious, disciplined and of great dignity

of Greek to that of mathematics. Other ancient mathematicians, Pythagoras, Euclid, Archimedes, are too familiar and too established in academic tradition to need more than a mention. Their significance for modern progress is attested by consideration of the dates of their first appearances in print (the importance of the invention of printing in this age can hardly be exaggerated). Euclid was printed in a Latin translation in 1482 and in Greek in 1533. Galen appeared in Greek in 1525; Hippocrates in Latin in the same year and in Greek the next. Archimedes was printed in Greek in 1544. Aldus Manutius had issued Aristotle and Theophrastus's *History of Plants* in 1495–8 and *Astronomici Veteres* in 1499.

Thus for some two hundred years Italy led the way in a blaze of cultural revival and creation which rivals the great age of ancient Greece. But when she passed under the political domination of Spain and experienced the depressing effects of the Catholic reaction her achievement and vigour declined. The lead passed to France and Germany and England, to which the leaven of Hellenism had from its ferment in Italy spread to inspire a new cultural unity. But that is another story. In this country we have seen a steady progress of the Hellenic influence in our scientific advance, in our literature and in our education. Spenser, Milton, Shelley, Keats, Tennyson, Matthew Arnold, Bridges are only a few of the poets in whom this inspiration has been strong. In the educational field the Grammar School tradition in its 16th-century beginning owed as much to the forces of the Renaissance as to those of the Reformation and flourishes still. If its curricula were somewhat narrowly linguistic the seed of enlightenment remained implicit in the study of Greek and Latin grammar which these schools were called into existence to serve and has borne fruit in the lives of those who have undergone the classical discipline. For it is the discipline of humanism, the belief in the freedom of the human mind to comprehend and direct, unfettered by dogmatism, the forces of life, the inspiration of a vision which "sees life steadily and sees it whole", which we owe to the poise, sobriety and many-sidedness of the Greek genius.